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Prospects For the Paper Industry For 1945

Manpower Shortage To Harvest Pulpwood Creates Critical Supply Situation In Pulp To Meet Increasing War Needs For Paper — Paper Supply May Not Materially Improve Until Close of Year.

By M. C. Dobrow, Executive Sec., Writing Paper Mfrs. Association

The time honored starting point for any business discussion is the war. It has been the most controlling in every business situation for the last five years, and it may well be so for another three years at least, after the war is over.

The military successes of last summer caused a great deal of optimism. We were all cheered by the decisive military victories of our armies in the battle for France last summer. We had hoped that the battle for Germany would be as swift and decisive. Instead, our armies met stiff opposition at the old West front.

It is difficult for us here to understand the problems of logistics—the problems of delivering the goods to the army in countries that have been denuded of rail equipment and motor vehicles.

This prolongation of the European phase of the war has a peculiar significance to the paper industry. This is caused by a word wide shortage of the basic raw materials from which paper is mainly produced.

On the supply side, the shortage of men has limited the cutting of pulpwood in Canada and the United States. This has made it difficult to sufficiently expand the supply of pulp to meet requirements. Under peacetime conditions the supply of wood pulp in the United States is augmented by imports of about 2,000,000 tons per year, largely from the Scandinavian Peninsula. Since the invasion of Norway in 1940, and the closing of the Skagarrak, these imports to the United States ceased.

On the demand side, we have had a great increase in the consumption of paper by Government, particularly in the needs of the vast military organization of 12,000,000 men. The paper needs of the civilian economy have also been great because of the tremendous increase in production of war goods, and the necessity for papers used as operating supplies in the countless defense plants which have been producing war goods around the clock every day of the last three years.

To all of this must be added the urgent needs of our British Allies who have previously depended almost entirely on importations of wood pulp from Scandanavia for the operation of their paper mills. Under the Good-Neighbor policy, it is also necessary to ship small amounts of pulp and paper to the Latin American countries to supplement their very limited domestic production.

As the German armies retreat back from the occupied countries into their home land, urgent requirements of liberated countries for paper to relieve their immediate situation are becoming evident. These demands will delay the transition from wartime to peacetime conditions as far as the paper industry is concerned. For months after the fighting ceases in Europe these needs, as well as the continuation of requirements under Lend-Lease, and the daily use requirements of our 6,000,000 men overseas in various parts of the globe, will require us to export large amounts of paper during most of 1945.

Pulpwood Supply Is Critical

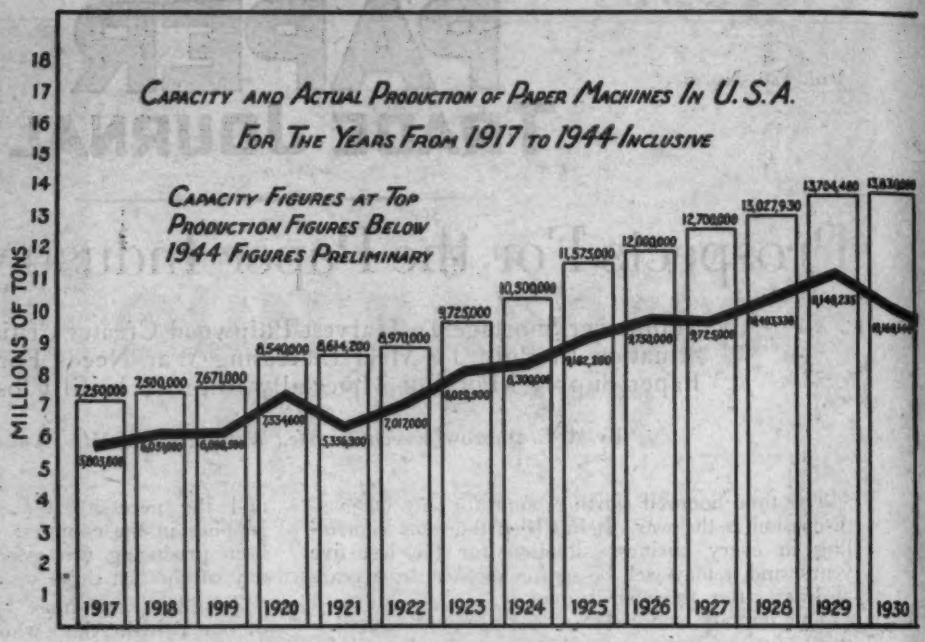
The cutting and delivering of pulpwood to pulp mills in most of 1944 were truly miracles of performance. The cutting in the first 3 quarters of the year was sufficient to bring about a partial recovery of inventory position which had deteriorated to dangerous points a year ago. The Canadian drought last fall, as well as a car shortage sharply curtailed deliveries in the 4th quarter of 1944. Pulpwood operations also declined in the United States during the 4th quarter so that the

UNITED STATES CAPACITY AND PRODUCTION BY GRADES

Grade	1941 Capacity	1941 Actual Production	%	1942 Capacity	1942 Actual Production	%	1943 Capacity	1943 Actual Production	%	1944 Estimated Capacity	1944 Estimated Actual Production	%
Writing paper	750,000	738,434	98	880,000	853,468	97	860,000	830,046	97	860,000	791,000	92
Other Fine Papers	224,800	211,580	94	200,000	190,007	95	200,000	180,555	90	200,000	176,000	88
Book Paper (Uncoated)	2,045,000	2,025,891	99	1,885,000	1,716,029	91	1,850,000	1,602,878	87	1,800,000	1,443,000	80
Groundwood Printing and Specialty Papers	660,000	642,676	97	675,000	610,168	90	660,000	585,673	89	660,000	578,000	87
Newsprint Paper	1,080,000	1,043,999	97	985,000	967,211	98	900,000	811,309	90	900,000	721,000	80
Tissue Paper	920,000	912,874	99	1,000,000	981,596	98	1,000,000	968,789	97	1,030,000	965,000	94
Wrapping Paper	2,955,000	2,778,441	94	3,085,000	2,713,738	88	3,050,000	2,501,637	82	3,100,000	2,560,000	83
Building Paper	1,175,000	917,912	78	1,200,000	1,001,383	83	1,100,000	877,582	80	1,100,000	881,000	80
All Other Papers	112,200	90,598	81	110,000	80,678	73	110,000	88,383	80	110,000	90,000	82
Total Paper	9,922,000	9,362,405	94	10,020,000	9,114,678	91	9,730,000	8,446,852	87	9,760,000	8,205,000	84
Paperboard	8,570,000	8,399,960	98	8,735,000	7,969,184	91	9,100,000	8,588,836	94	9,500,000	8,979,000	95
Total Paper and Paperboard	18,492,000	17,762,365	96	18,755,000	17,083,862	91	18,830,000	17,035,688	90	19,260,000	17,184,000	89

improved inventory position of October 1st was entirely lost by December 31, 1944.

United States imports of Canadian pulpwood during 1945 have been set at a minimum of 1,250,000 cords. The 1944 import quota was originally set at this same figure, but was increased in July by a supplementary allocation of 255,000 cords. It is expected that a similar supplemental quota will be granted by Canada in 1945, but the exact amount will not be determined until after the close of the pulpwood production season in Canada next spring.



During January and early in February the situation appeared none too good because of the extremely heavy snowfall and manpower shortage. Pulpwood cutting also bogged down in the South. Unless there is a recovery of wood production, further curtailment in pulp and paper production is in prospect.

The only ray of sunshine in the picture is the willingness of the Army to make available 10,000 additional prisoners of war if the mills can set up properly safeguarded camps.

Pulp Supply Is Inadequate

Production of wood pulp in the United States increased by 44% in the five year interval from 1939 to 1944, but this gain was inadequate to produce all the paper required by the military services, essential civilian needs, and the amounts of pulp and paper required to be furnished under Lend-Lease and Good Neighbor policy.

Pulp 'authorizations to use' for the 1st quarter of 1945 are on substantially the same basis as they were for the 4th quarter of 1944. However, inventories have been declining and the authorizations and allocations made for the 1st quarter are based on a 5-day average mill inventory..

It is no surprise that mills from time to time lose production because pulp fails to arrive on time in view of the tight supply and diminished inventories. Overall pulp inventories in the United States have long since been below amounts considered as a minimum practical operating supply.

In connection with the allocation for the 1st quarter, it is important to note that FEA requested an allocation of 90,000 tons of wood pulp for the liberated areas which request was turned down. Had this request been allowed, it would have meant the shutting down of some 50 converting mills, or the increase of withholding assessments against integrated mills from the present 15% to 25%. Paper will be furnished as required by FEA, but every effort will be made to carefully screen all requests.

Such requests for pulp for liberated areas may not be turned down indefinitely. One of the factors permitting the turndown in December was the lack of available shipping space. There are indications that limited amounts of shipping space will be available at a later date when the matter can be reopened.

PULP INVENTORIES IN U. S.

	Dec. 31 1944 (Tons)	Dec. 31 1943 (Tons)	Dec. 31 1944 (Tons)
Bleached Sulphite			
Paper Grades	149,000	81,000	28,000
Non Paper Grades	138,000	103,000	124,000
Unbleached Sulphite	205,000	72,000	44,000
Bleached Sulphite	73,000	28,000	27,000
Unbleached Sulphate	165,000	19,000	39,000
Soda	28,000	15,000	16,000
Groundwood	83,000	71,000	41,000
Miscellaneous	31,000	18,000	14,000
Total	872,000	427,000	333,000

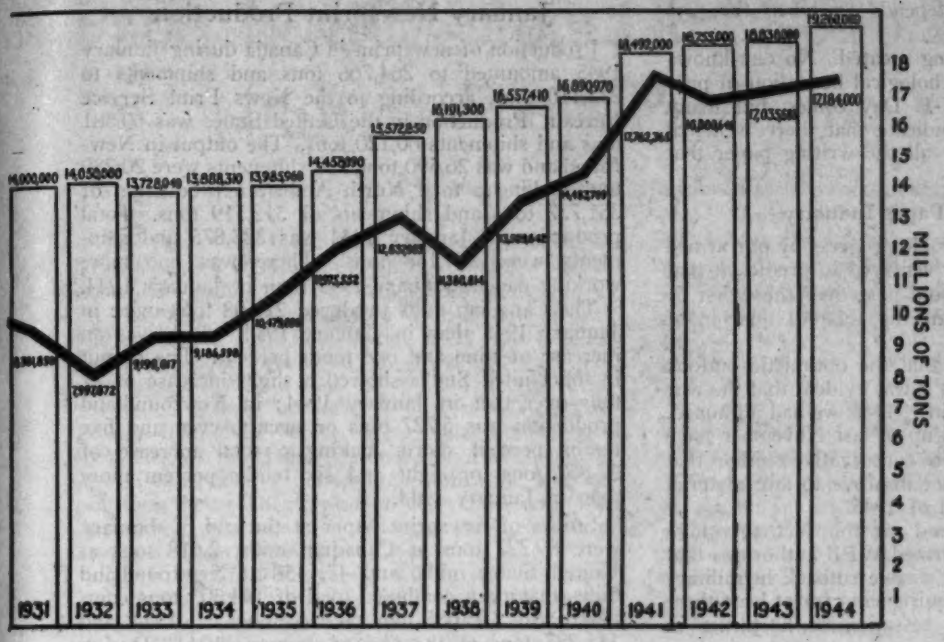
The industry will also have to reckon with an increase of 50% in nitrating pulp requirements by June 1st, only a part of which will be made up by increased production on the West coast. It is inescapable, therefore, if the war is not over in the first quarter, the paper industry will have to pull in its belt several notches.

Immediately after the termination of hostilities in Europe, it is to be expected that the military requirements for pulp for nitrating will be sharply curtailed. This will be helpful promptly to the pulp supply situation in the United States, but it will require

WOOD PULP (All Grades)

Statistical Position in War Years

	U. S. Domestic Production	U. S. Imports	U. S. Exports	U. S. Total Supply	Used in Self-contained Mills	Available for Market
1939	6,993,334	2,026,441	139,504	8,880,271	5,958,900	2,921,371
1940	8,959,559	1,224,570	480,938	9,703,191	7,046,560	2,656,631
1941	10,375,422	1,157,886	328,608	11,204,700	7,925,029	3,279,671
1942	10,768,910	1,227,000	378,148	11,617,762	7,859,163	3,758,599
1943	9,657,914	1,254,000	300,700	10,611,214	7,557,000	3,054,214
1944	10,087,000	1,044,000	191,000	10,940,000	7,800,000	3,140,000



imports of Scandanavian pulp in volume to bring about a balance of supply and demand. Furthermore, these imports will have to continue for a considerable time to develop any surplus which may be added to existing inventories to bring them up to a practical working basis.

When it is feasible to clear the Skagerrak of mines, resumption of shipments from Sweden may be expected without much delay, but it will be many, many months before the supply of pulp is adequate in the United States for the resumption of a free market—that is a market that does not require allocations or other governmental controls.

Industry Performance in 1944

In 1944 the industry produced 17,184,000 tons of paper and paper board. For the industry as a whole this was somewhat higher than the year before. However, the detailed figures need to be examined carefully because the trends for paper and paper board have not been the same in recent years.

In 1944 the production of paperboard increased nearly 400,000 tons over 1943 production, whereas the production of all grades of paper declined about 200,000 tons. Paper production reached its peak in 1941 at 9,362,000 tons. 1944 production at 8,205,000 tons was down 12% from the peak year.

Paperboard production in 1941 was 8,400,000 tons, and close to 9,000,000 tons in 1944, an increase of 7% in the last 3 years of general shortage.

The packaging needs of war materials have been met in satisfactory fashion. The dwindling supply of raw material forced necessary economy in paper. These economies were brought about by limited restrictions on consumption, and by the reduction of basis weights wherever the functional use of a sheet could be maintained despite the spreading of fiber over a larger area.

War Uses of Fine Papers

Fine paper production in 1944 was 967,000 tons as compared with 1,011,000 tons in 1943—a decline of 4%. The decreased tonnage in 1944 represented more yardage or surface area because weights were lighter than in 1943.

Shipments to markets in 1944 were in excess of the year's production and resulted in further depletion of inventories at writing paper mills to the lowest point since 1920. Distributors' inventories also declined, and there is evidence of lessened inventories in the hands of consumers.

Consumption of Fine Paper is related to the volume of business and the volume of distribution of goods to consumers. In the last few years an unimportant part of the production of Fine Papers went to support military operations, and for use as operating supplies in numerous defense plants.

Because of the nature of the commodity and the complexity of gathering such information the industry has never obtained complete data on the end use of its products until it became a necessity in this war emergency. Current estimates, based on figures recently gathered, indicate that fine paper production has been distributed to the following channels:

	%
Class I. Government, FEA and Defense Plants	67
Class II. Communications, Transportations, public service and agricultural products	22
Class III. Mfgrs. of civilian products, retail, household and miscellaneous	11
	100

Military requirements in Class I include such "must" items as reproduction papers (blueprint, negative), map and chart paper, special wet strength map paper that can be used in the field in all climates, invasion currency papers and a host of other special purpose papers.

The channels of consumption will necessarily be greatly altered when peacetime conditions return, but in the period of reconversion we have several factors that will strongly influence demand for writing papers.

The Army will continue to consume large quantities of writing papers until demobilization reduces the Army personnel in important numbers.

In the second six months of 1944 the Writing Paper Industry was shipping to the United States Government and its agencies a larger tonnage and a larger proportion of its production than at any time in the war. Conversely, the shipments of writing papers to the commercial markets is currently the smallest amount of any time in the war.

Restoration of an adequate supply of paper of prewar qualities cannot be expected for at least several months after the end of the fighting in Europe.

It is hardly likely that prewar qualities with respect to weights, varieties, colors, etc., will be restored during the second or third quarter of 1945, and

beyond that everything depends on when the war will end.

Civilian deficits are being created. No one knows of what duration the psychological hesitation in purchasing may be when V-E Day comes, but many factors in the situation indicate that there is actual and potential demand for all the writing paper that can be produced in 1945.

Prospects of Paper Industry

As a result of the favorable progress by our armed forces last summer, many ventured to predict at that time that the industry would pass over the worst of the shortage some time during the 4th quarter of 1944.

The sudden realization that the optimistic outlook was premature came when it was evident that the war in Europe would not end in 1944 as we had all hoped. The optimistic views held up to last November have now been displaced by more conservative opinion that the paper situation will not improve to any material extent until about the end of 1945.

This conclusion is based on the fact that high military officials have informed WPB authorities that there probably will be no sizable cutback in military paper and paper board requirements for at least three to six months after the cessation of hostilities in Europe.

Consequently, so long as this demand continues, there is little prospect of alleviating the current shortage. Moreover, because the complete defeat of Germany cannot now be counted on before spring or summer of 1945, it is not likely that the armed forces will reduce their consumption of paper until the last quarter of 1945 or the first quarter of 1946.

Civilian paper users will probably be forced to effect further economies in their paper and paper board consumption in 1945, and waste paper collection campaigns will have to be stepped up and maintained well above current levels.

It is probable that the pulp and paper industry will be one of the last major consumer goods industries to achieve a production level equal to, or in excess of, demand.

Sutherland Paper Co. To Expand

The Sutherland Paper Company, of Kalamazoo, Mich., according to The *Wall Street Journal*, expects to enlarge its converting facilities after the war. Already a number of new products have been developed for marketing along with the company's usual lines of cartons, paper pails, paper plates, paper cans, egg cases, etc. The company hopes that many of the paper board packages designed for the food industry to replace metal cans during the war period will be reordered after the war is over. Normally about 90% of the company's package production is used by food manufacturers and 7% for tobacco and personal hygiene products. Pre-war capacity of the company plants was 350 tons of high-grade paper box board daily, of which about two-thirds was converted in Sutherland's mills. During 1944, the company eliminated its funded debt through the payment of the last $200,000 due on its debentures. The audited annual report for 1944, recently issued, shows a decline of about $500,000 in sales from 1943, the result of shortages of waste paper and wood pulp allocations. Operating costs rose because of overtime costs—most of the mill employes work 12 hours a day—and increased costs of waste paper and pulp which have had to be absorbed by the company.

January Newsprint Production

Production of newsprint in Canada during January 1945 amounted to 264,766 tons and shipments to 232,110 tons, according to the News Print Service Bureau. Production in the United States was 60,381 tons and shipments 60,120 tons. The output in Newfoundland was 26,590 tons and shipments were 20,289 tons making a total North American production of 351,737 tons and shipments of 312,519 tons. Total production in January 1944 was 323,875 and shipments were 284,138 tons. There was one more working day in January 1945 than in January 1944.

The Canadian mills produced 22,108 tons more in January 1945 than in January 1944, which was an increase of nine and one tenth percent. The output in the United States showed a slight increase of 27 tons over that in January 1944; in Newfoundland production was 5,727 tons or twenty-seven and five tenths percent more, making a total increase of 27,862 tons, or eight and six tenths percent more than in January 1944.

Stocks of newsprint paper at the end of January were 89,227 tons at Canadian mills, 7,618 tons at United States mills, and 47, 458 at Newfoundland mills, making a combined total of 144,303 tons compared with 105,085 tons on December 31, 1944, and 155,287 tons at the end of January 1944. During the winter some tonnage is accumulating at points from which water shipments will later be made.

Powell River Extends Ownership

Three hundred thousand shares in the Powell River Company were recently offered at Vancouver, B. C. at $18.50 per share and were oversubscribed almost immediately. Harold Foley, president of the company, states that it does not constitute further financing or capital addition by the company, nor does it represent a change in the control of the company which has until now been held by the Brookes-Scanlon intrests.

Mr. Foley states that the company regards with appreciation, however, the desire of present shareholders to extend ownership of the company among the public. The Powell River Company has been a family concern since it was established in British Columbia 34 years ago, by Dr. Dwight F. Brookes and his partner, M. J. Scanlon of St. Paul.

The company has no bonds outstanding and is converting its preferred stock into common so that the only outstanding stocks of the company will be the 1,344,695 no par value ordinary shares of which 300,090 now being offered form a part. The company has paid a profit since its inception, and is one of the largest producers of newsprint.

Book Paper Output Declines

Production of uncoated book paper in 1944 amounted to 1,388,800 tons, a drop of 7.1% from 1943 and a 11.6% drop from 1942. Production was at an even rate during the first half of the year, fell off during July, then increased for the next four months at an even rate several points lower than at the beginning of the year. December decreased several points lower than the preceding four months. Shipments of uncoated book paper in 1944 amounted to 1,386,700 tons, 7.5% below 1943.

Coated book paper production in 1944 amounted to 221,300 tons, a decrease of 1.7% from 1943, but an increase of 6.5% over 1942. Shipments of 220,400 tons were 4.3% below 1943 shipments.

Paper Board Output Increased 3.2 Per Cent In 1944 Above Preceding Year

By Grafton Whiting, Statistician, National Paperboard Association

The paper board industry in 1944 produced 7,810,000 tons (preliminary) which represents an increase of about 3.2% over the 7,570,000 tons made in 1943 and is within 28,000 tons of the all-time high record of 7,838,000 tons in 1941. The demand for paper board exceeded all previous totals and there was built up a bank of unfilled orders which reached a volume in the first quarter of the year greater than ever before. The mills, handicapped by a lack of raw materials and a shortage of manpower, were at first unable to cope with the pressure put upon them. Then a gradual correction took place during the remainder of the year which served to ease somewhat the tension.

The Government has inaugurated a series of paper and paper board statistics, aside from the annual Census, under the auspices of the War Production Board. The figures presented for paper board are not in agreement with our exhibits since there have been added in the Government compilations certain items which our industry does not consider as paper board; namely, wall board, binders board, leather board, etc. These additions are carried throughout the series and thus do not affect the year to year comparison. In 1943, for the first time in the history of the industry, the relative position of paper board to the total of all grades rose above the 50% line, as follows:

Year	Paperboard	Paper
1942	46.6%	53.4%
1943	50.4%	49.6%
1944*	52.3%	47.6%

This emphasizes the growing importance of paper board in the war effort. In the post-war period the position of paper will improve with the lifting of restrictions, but among the many new war-developed uses for paper board a substantial proportion will continue to rely upon this source of supply.

Orders at All-time High Level

The demand for paper board brought a new all-time high of unfilled orders to 655,000 tons on March 11 of this year, equivalent of 25.2 days to run. This was an advance of 450,000 tons from the low point of 208,000 tons in 1942. The previous high came with the upswing which peaked in August 1941, with 593,000 tons.

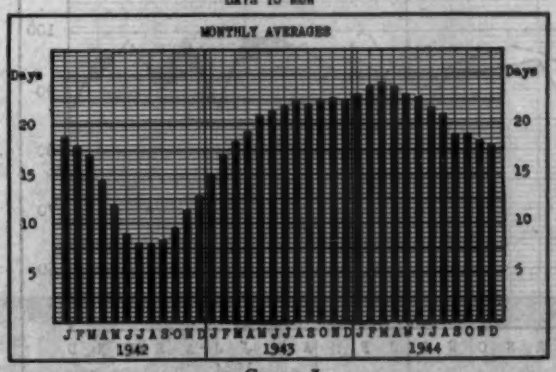


CHART I

The Bank of Unfilled Orders Is Expressed as the Number of Days to Run Necessary to Complete all Outstanding Orders Based upon Full Operation for a 24 Hour Period. The Days are Here Shown as a Monthly Average.

The duration of this upswing from the low point at the start to the low point at the end was 20 months. The present movement is the longest ever experienced and has already lasted 28 months with every prospect of continuing for many months to come.

The use of paper board is related in a general way to the output of all industry because paper board packages are required as protection in the transportation of so many commodities and also because of the many special items for which paper board is employed.

The Federal Reserve Board index is an overall measurement of the changes in physical volume of production. It reached a peak of 247 points the latter part of 1943 and has shown a slow but continued decline since then to 231 points at the close of 1944. The demand for paper board did not reach its peak until March of last year, but from then on it responded to the change in trend and to the controls exercised by the Government.

ORDERS—AVERAGE WEEKLY

Period	Orders Received Tons	Days to Run At End
1st Quarter 1943	154,900	19.2
2nd Quarter 1943	158,100	22.3
3rd Quarter 1943	147,600	22.1
4th Quarter 1943	145,700	22.5
1st Quarter 1944	149,600	23.3
2nd Quarter 1944	151,400	20.9
3rd Quarter 1944	146,900	18.1
4th Quarter 1944	151,400	17.6

The bank of unfilled orders or days to run is the balance between orders as they come in and fulfillment as it is made. Any forecast is predicated therefore upon two unknown factors, demand and supply. It is expected that the days to run will decline gradually until after V-E day and then more rapidly until Government controls are lifted and reconversion with a revived civilian demand is free to assert itself to the point where business volume is sufficient to reverse the trend.

The large bank of orders yet to be filled will act as a balancing factor between demand and supply. It now stands at over twice the back-log of 8 days, which, in pre-war years, was considered an excellent position.

Production Highest in Secured Trustee

The year's production, as in 1943, was proportioned between military and civilian needs but more volume went to the war effort than formerly. Civilian requirements suffered accordingly and the scarcity of paper board packaging material was such that substitutes were resorted to. No statistical analysis of end-use between military and civilian consumption can be made because at the time of packaging the destination is not always known. For example, certain foodstuffs for army camps and retail sales go

through the same packaging process. However, a separation by grades of boards made shows in part what has taken place.

PRODUCTION

Year	Period	Average Weekly Tons Container	Folding	Set-Up	Other	Total
1942	1st Quarter	84,900	36,700	15,500	30,100	167,200
	2nd Quarter	66,700	30,300	11,800	26,100	134,900
	3rd Quarter	61,000	23,900	9,300	24,800	119,000
	4th Quarter	66,400	29,200	10,000	23,900	129,500
1943	1st Quarter	74,700	32,600	11,600	25,600	144,500
	2nd Quarter	77,000	34,500	12,300	25,600	149,400
	3rd Quarter	75,400	33,100	11,900	25,100	145,500
	4th Quarter	75,800	32,200	10,400	24,700	143,100
1944	1st Quarter	76,500	32,900	11,600	25,600	148,600
	2nd Quarter	82,300	34,600	11,500	27,700	156,100
	3rd Quarter	81,500	33,600	10,500	25,600	151,200
	4th Quarter	79,100	35,200	10,700	26,600	151,600

The first quarter of 1942 was the high point in production for all grades followed by a sharp decrease ending in the third quarter. Since then each division has gained in volume with container boards and folding box boards showing the largest and set-up board the least improvement. This reflects the pressure of the war effort, since packaging material and shipping containers are in heavy demand for sending supplies to our armed forces and lend-lease aid, whereas the end use of set-up boxes is less important for war uses.

The relative position of the grades expressed in percentages is as follows:

Year	Container	Folding	Set-Up	Other	Total
1942	50.7%	21.8%	8.5%	19.0%	100%
1943	52.0%	22.7%	7.9%	17.4%	100%
1944	52.6%	22.4%	7.2%	17.8%	100%

The directives issued under the controls established by the Government have stressed the urgent demand for shipping containers and the response made by the industry is evident in the increase to 52.6% of the total tonnage output. Probably the biggest single use of paper board for direct war purposes is in the manufacture of export shipping containers commonly designated as "V-Boxes." These require a large amount of kraft pulp in making a board of the specified strength. Fortunately the pulp mills have been able to increase the supply to meet this need.

Activity or Operating Rate

The term "activity" is used to designate the time paper board mills are in operation producing board.

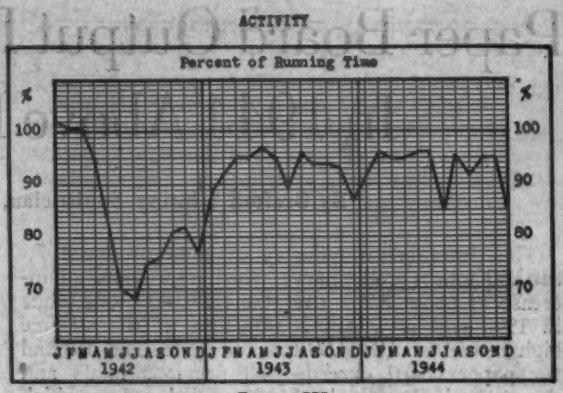


CHART III

Actual Operating Hours Each Week Divided by 144 Hours (6 Day Week) Gives the Per Cent of Activity Here Consolidated into Monthly Periods. The Chart Line Follows in General the Production Line on Chart No. II.

The hours of actual running are reported weekly by each mill and contrasted with a possible full week of 6 days or 144 hours (6 x 24) to obtain a percent of activity. By adding these together on a comparable basis, the percentage for the whole is found and is shown on Chart III consolidated by months.

The cumulative activity this year stands at 93% compared with 93% in 1943, and 84% in 1942. The regularity in operating time week by week in the year 1944, omitting holidays, was more pronounced than in the past years, as shown by the following:

Year	High	Low	Spread
1942	102%	68%	34 points
1943	97%	86%	11 points
1944	98%	91%	7 points

These figures are of necessity general averages and overlook the ups and downs in any one plant but they do show the effect of the sustained demand that has permitted mills to operate close to the 6 day a week level. The average for all operating plants is 5 days and 20 hours. Consistency in operating time is of distinct advantage in mill operation for the reason that continuity of work can be counted upon and the scheduling of orders and efficiency are aided by regularity in running time.

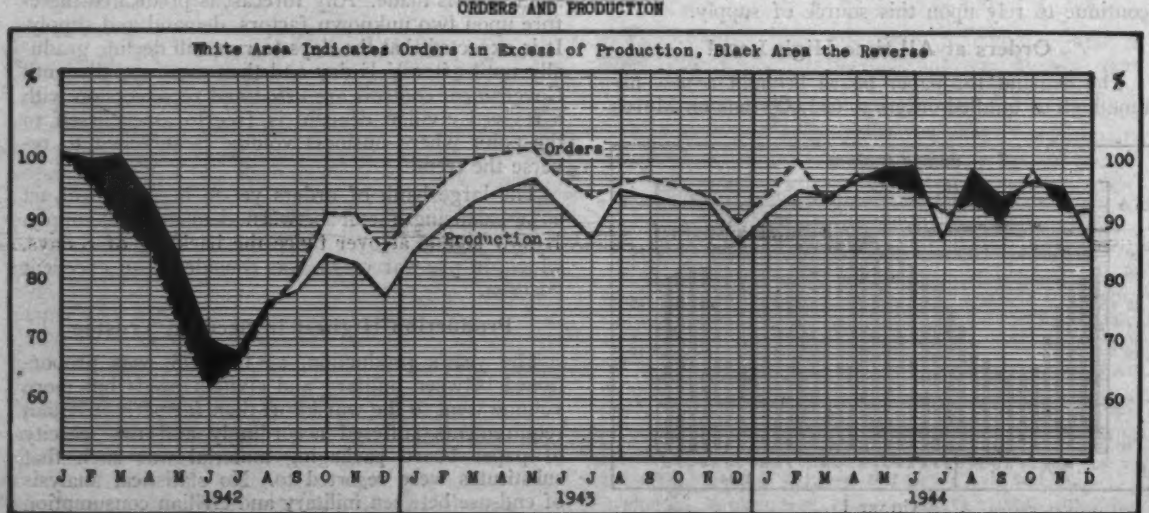

ORDERS AND PRODUCTION
White Area Indicates Orders in Excess of Production, Black Area the Reverse
%
100
90
80
70
60
Orders
Production
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1942
1943
1944

CHART II

Incoming Orders and Production Made in Their Fulfillment Are Reduced to a Percentage, with 100% Equal to Six Days of Full Operation. Over a Given Period when Unfilled Orders Reach the Level at Which the Movement Started the White Area-Excess of Orders Is Offset and Balanced by the Black Area-Excess of Production.

BIRD MACHINERY—Of Critical Importance

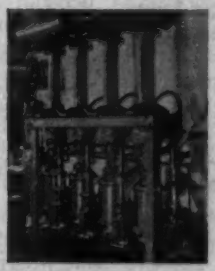
To the Making of Good Paper and More of It Per Day at Lower Cost Per Ton

The BIRD SCREEN handles the bulk of all grades of paper made on this Continent. It is regarded as essential for continuous production of uniformly good paper at high speed.

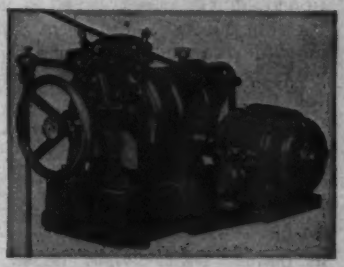
The JONSSON SCREEN is producing cleaner pulp and more of it at lower cost. It is an ideal knotter for all grades, *coarse screen* on groundwood, soda, sulphite and sulphate, *fine screen* on chemical pulps, bleached or unbleached, and *tailings screen.*

The BIRD CENTRIFINER produces cleanest paper of fine and special grades by triple centrifugal treatment; assures thorough separation of specks of heavy dirt, light dirt, rubber particles, etc.

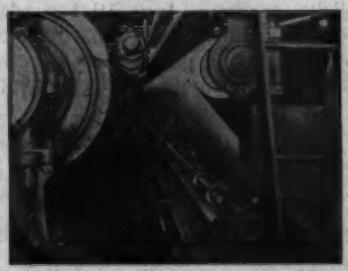
The BIRD SAVE-ALL is heavily relied upon to keep precious fibres from escaping with paper machine waste water. It returns stock and water for immediate re-use at lowest net cost.



The BIRD DIRTEC is the newest and most effective method of removing dirt from paper stock by pressure drop, continuously, efficiently and economically. It is easy to install and operate; employs no moving parts.



The BIRD CONSISTENCY REGULATOR holds stock consistency to within plus or minus 0.1%, operating on stock from less than 1% to 12% consistency. Instantaneous in action. Recommended wherever dependable pulp or paper stock consistency control is essential.



The VICKERY FELT CONDITIONER keeps press felts continuously clean and open without mid-week shutdowns, improves paper finish and assures maximum water removal at the presses.

The VICKERY DOCTOR keeps papermaking roll surfaces always in shape to do their best work. Essential for continuously efficient operation of press rolls, wire rolls, breast rolls, dryers, calenders and super-calenders.

For complete information on any or all items of Bird Machinery get in touch with

BIRD MACHINE COMPANY

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Pulp Supply Situation

The production of pulp in the United States during the first 11 months of 1944 was 8,650,000 tons, a gain of 3.8% compared with 1943; Canada made 4,750,000 tons, the same as a year ago, and sending us 967,700 tons for use in paper and paper board mills.

In May of 1943 the Government established a Pulp Allocation Board when a scarcity of pulp was first threatened. The board gradually has increased its control until now all pulp is regulated, based upon the end-use to which the mill production is put.

Pulp consumed in making paper board may be roughly divided into two parts: namely, that which is produced by the pulp mills and processed directly into board, and that which is purchased by non-intergrated mills as a raw material. The former includes the kraft pulp and board mills located in the South and on the Pacific Coast. Their problem during the year has not been insufficient capacity but a lack of manpower both in the cutting of wood and in the mills. Adverse weather has been another handicap but in the face of these difficulties there was produced 8% more than in 1943.

The independent mills rely upon the pulp offered for sale to obtain their supply. This comes from domestic mills (some of them the kraft mills mentioned above, which divert a portion of their pulp for this purpose) and from Canadian imports. The amounts available during each quarter for the past 2 years is stated as an average monthly tonnage as follows:

MARKET PULP
Average Tonnage per Month

	1943			1944		
Period	Domestic Mills	Canada Imports	Total	Domestic Mills	Canada Imports	Total
1st Quarter	122,000	101,700	223,700	114,000	85,300	199,300
2nd Quarter	111,600	107,300	218,900	120,900	94,600	215,500
3rd Quarter	102,000	107,000	209,000	133,500	83,400	216,900
4th Quarter	102,100	93,400	195,500	139,900	88,800	228,700 *

* October and November average only.

In addition, there has been a small amount of pulp received from Newfoundland.

The paper mills take the largest portion of this purchased pulp as their chief raw material, whereas the paper board mills use waste paper stock, with pulp as a secondary but important part of their usage. Of the amount consumed 45% was kraft; 23% unbleached sulphite; 22% groundwood and 10% bleached grades.

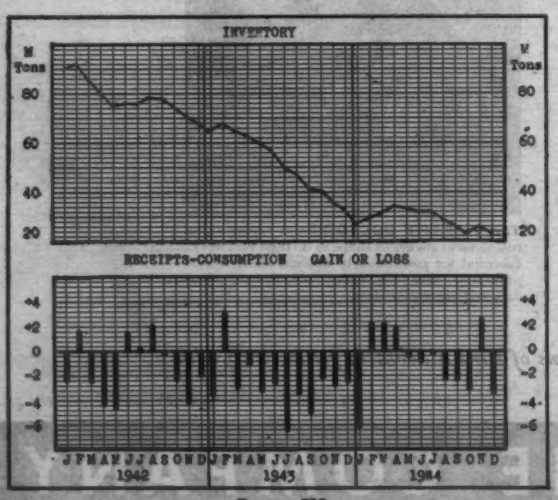

CHART IV

Inventories of Purchased Pulp Reported by Identical Paperboard Mills Are Shown in Tons at the Month End in the Upper Section of the Chart. The Lower Division Indicates the Gains or Losses Incurred. The Scale of This Section Is Enlarged to Accommodate Small Items.

Reports from identical paper board consumers of purchased pulp, representing a large portion of the industry, show how the effort made to maintain full production in the face of a dwindling supply drew upon inventories. Starting with 91,000 tons on hand at the opening of 1942, there remains an inventory at the close of 1944 of only 22,360 tons, which is below the minimum necessary for normal operation. Chart IV gives the inventory trend and the gain or loss between receipts and consumption.

As is found in the kraft mills, it is not a lack of capacity that has brought a scarcity of all grades of pulp, but the manpower. Induction and the lure of high wages in war plants has depleted the wood crews. Prisoners of war are being used both in Canada and in this country to relieve the shortage, but there is little prospect of an adequate increase before the second half of 1945.

Already in the first half of this year there is an increased demand for nitrating pulps for explosives and lend-lease will call for further exports. All this drain upon the pulp supply has caused a greater demand for reclaimed fibers obtained from waste papers to replace virgin pulp.

Waste Paper Collections High

A publicity campaign to stimulate collections of waste paper was started in June 1943. This was augmented later in the year by the WPB Salvage Division lending its aid, and following this, the publicity given by the American Newspaper Publishers Association and the Periodical Publishers Association.

This campaign was continued throughout 1944 and the program, with the opening of 1945, will be carried on with even greater intensity.

The paper board industry consumes over 80% of the total waste paper used by all the mills in this country and contributions totaling about one and one-quarter million dollars have been made to support the publicity program, June 1943 to date. Through a series of statistical reports participated in by a large percentage of the industry there is procured a statement of the average weekly receipts, consumption and ending inventory by quarter years, as follows:

WASTE PAPER STOCK
Average Weekly Tons, Closing Inventory, Average Prices

Periods			Received	Consumed	On Hand	Price *
1942	3rd	Quarter	56,100	55,400	349,900	$6.00
1942	4th	Quarter	57,600	58,900	332,600	6.25
1943	1st	Quarter	66,500	69,700	291,500	11.00
1943	2nd	Quarter	69,700	75,200	220,200	14.00
1943	3rd	Quarter	66,100	72,700	133,400	14.00
1943	4th	Quarter	65,100	68,200	93,200	14.00
1944	1st	Quarter	73,100	72,700	96,100	14.00
1944	2nd	Quarter	76,300	75,100	110,700	14.00
1944	3rd	Quarter	74,600	71,200	149,000	19.00
1944	4th	Quarter	74,200	73,200	159,000	19.00

* No. 1 Mixed Paper averaged East and West.

The necessity for arousing public support in the saving of waste paper is evidenced by the dwindling inventories on hand at the mills during the latter part of 1943 and opening of 1944. The gains during the remainder of the year show the degree of success attained, but the position is still below the adequate supply previously held. There is unfortunately a maldistribution of the holdings, with some mills so low that curtailment of production is necessary for lack of this raw material.

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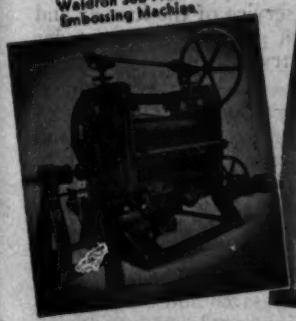
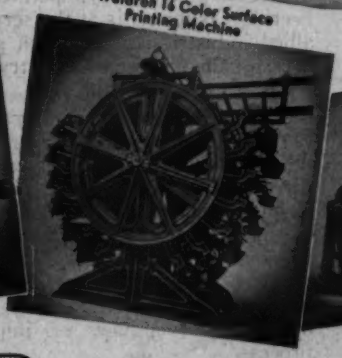
The same mature knowledge and experience is available to you for insuring faster production of a better finished product through operation of accurately designed Waldron machines — for every step in paper processing. We invite your inquiries — in confidence if desired.

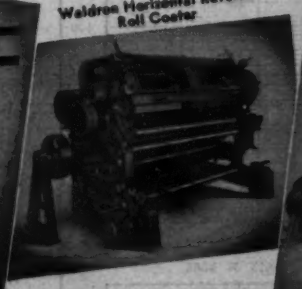
Waldron Sub Frame Embossing Machine



Waldron 16 Color Surface Printing Machine



Waldron Horizontal Reverse Roll Coater



Waldron Vertical Laminating Machine

Aniline Printing Machines
Combing Machines
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Floor Covering Machines
Gumming Machines
Rubber Mill Machines
Wall Paper Printing
Waxing Machines
Winders and Slitters
Special Design Machines

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WALDRON
Paper Converting Machinery

An increase in ceiling prices of from $2.00 to $5.00 a ton was made effective July 17, 1944 and aided the incentive to greater collection, and during the 3rd and 4th quarters improvement was made. However, inclement winter weather has interfered with collections during December and January of this year to the extent that an average weekly loss of 2,000 tons has been sustained.

Chart V shows the inventory trend and also the gain or loss between receipts and consumption.

There are two factors involved in the waste paper situation; the amount available for collection and the process of gathering, sorting and delivery to the mills.

The total production of paper and paper board was slightly more in 1944 than in 1943 but the amount available for salvage was less, due to the increased volume sent out of this country in the form of packaging for supplies for our armed forces and for lend-lease. This decrease has had to be offset by a more intensive drive in salvaging what remains.

The Boy Scouts of America and the school pupils have been exceptionally successful in this effort. However, the process of sorting and bailing has been handicapped by a lack of manpower and the mills have been sorely tried with bundled papers often breaking loose in handling. As a result it has been stated that only 75% of the material consists of usable fibre, whereas usable fibre formerly ranged up to 90%.

The necessity for continuing and increasing the salvage campaign is evident. Spasmodic drives are a help but what is needed is a steady flow. Just as the production and use of paper and paper board is a continuing operation, so should be the collection of waste paper.

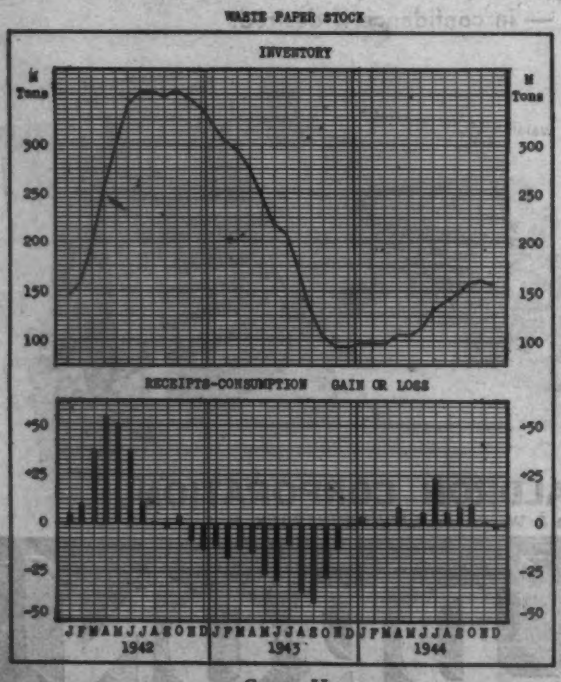

CHART V

Inventories of Waste Paper Reported by Identical Companies Are Shown in Tons at the Month End in the Upper Section of the Chart. The Lower Division Indicates the Gains or Losses Incurred. The Scale of This Section Is Enlarged to Accommodate Small Items.

Paper Board an Essential Product

A shortage of raw material and manpower is common today in most industries, but paper board manufacturing is among the 35 activities classed as essential and by many it is considered as being in a more critical situation, even than steel. This may well be the case since no distribution of the many items made for civilian and military use could continue without adequate packaging and shipping containers in which to move these products. There is no large surplus of these to fall back upon and an uninterrupted flow must be maintained from the paper board mill, through the fabricators of boxes, to the manufacturers to meet their shipping schedules.

The paper board industry is proud of its accomplishments in 1944 because in spite of the many handicaps it produced more board than in 1943 or 1942. Although civilian needs may have suffered, the military requirements have been met in full compliance with rigid specifications, and on schedule.

Inspect New Wood Laboratory

Nearly 200 leaders of industry and government saw the lumber industry at work on the future when recently they inspected the newly completed Lumber Industry Laboratory in Washington, D. C.

Hosts were the Timber Engineering Company, the National Lumber Manufacturers Association and the American Forest Products Industries, Inc. While the affair was a "party," the work of the laboratory went right on while interested guests watched proceedings and listened to explanations made by laboratory staff members.

Guests showed intense interest in the chemical laboratory where experiments are conducted seeking uses for lignin. In the same division of the laboratory production of wood sugar and ethyl alcohol from sawmill wastes was explained. Microscopic studies of wood were displayed.

The shop-laboratory, operated by the Timber Engineering Company, is at the service of the lumber and allied industries. A research program is now under way for the hardwood industry.

"It is not our purpose to be concerned with fundamental or pure research, for which the facilities of the United States Forest Products Laboratory and other laboratories are adequate," said Carl Rishell, director of research for the Timber Engineering Company and the American Forest Products Industries. "Rather, we are interested chiefly in bringing to commercial usefulness the results of fundamental research done elsewhere. W hope to help industry bridge the gap between pure resarch and the practical operation of a new or improved manufacturing process."

Mr. Rishell is assisted at the laboratory by a staff of chemists and wood technicians, specialists in their fields. Harry G. Uhl is president of Timber Engineering Company and R. G. Kimbell is vice president.

Bolivia's Paper Industry

Bolivia's paper industry in 1943 was composed of four firms whose invested capital of $143,119 represented less than 1 percent of the total capital invested in Bolivian manufacturing industries, says a report to the Department of Commerce. Production and sales were valued at $118,213 and $108,737 respectively.

With everyone in and out of the industry aware of the unprecedented importance of pulp, it is the privilege as well as the problem of every pulp and paper producer and user to do everything in his power to conserve and give precedent to every possible bit of this vital material where it will count most — for the successful operation of the war.

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Newsprint Production in North America Showed Slight Decline in 1944

By Royal S. Kellogg, Secretary, News Print Service Bureau

The output of the paper and paper board machines in North America in 1944 was in excess of 21,000,000 tons. This was a great accomplishment under wartime limitations of raw material, labor, repair and replacements. Every mill did the best it could. There was a demand for more than it could make and a large proportion of the product went directly into war use. The balance was so necessary to the maintenance of the American way of life that it also could be classified as an essential commodity.

In the United States the Bureau of the Census officially reports total output of 17,183,000 tons of which 8,973,000 tons or 52% was paper board. The Canadian and Newfoundland output of newsprint was 3,265,000 tons and there was undoubtedly a production in the neighborhood of 900,000 tons of other grades of paper in Canada during the year. This adds up to an approximate continental grand total of around 21,348,000 tons.

While figures are lacking, it is certain that under the circumstances the North American output of paper and paper board in 1944 greatly exceeded the rest of the world combined.

The newsprint figures run as follows:

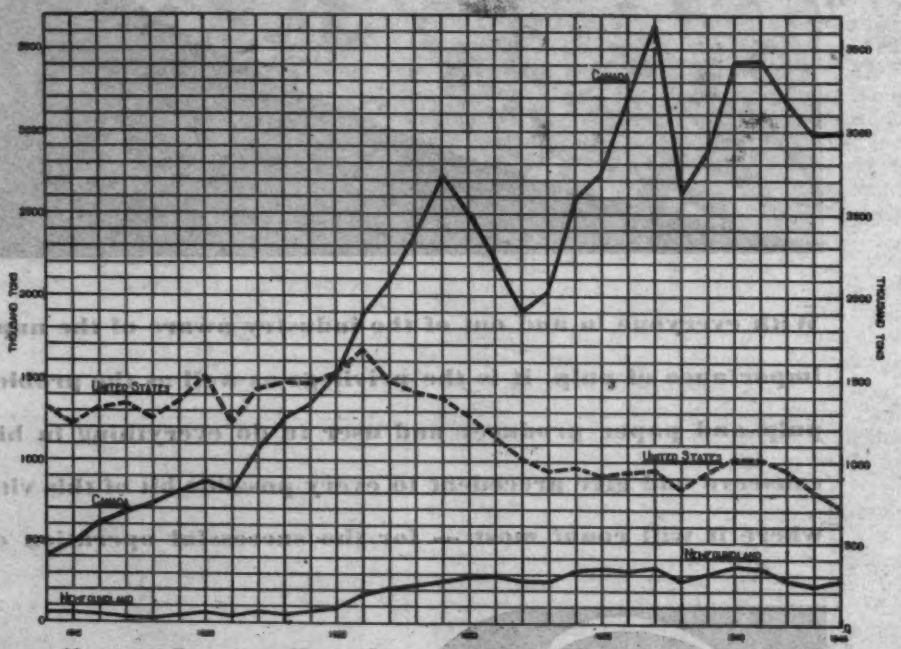
Production Declines Slightly

The 3,984,000 tons of newsprint made in North America last year was only 1% less than in the preceding year. It was supplied to the extent of 7% by Newfoundland, 18% by the United States and 75% by Canada. There was a slight increase in the Canadian output—9,000 tons—over 1943, a decrease of 85,000 tons in United States production and an increase of 37,000 tons in Newfoundland production.

The newsprint total in Canada in 1944 ranked 6% below the five-year average of 3,175,000 tons, for 1939-43. During the same half decade the Newfoundland mills averaged 303,000 tons, so last year was 10% under the recent average.

The amount of newsprint manufactured in the United States in 1944 was the least in any recorded year since 1900. At that time and for a number of years thereafter domestic mills were the only source of white paper for United States newspapers.

Shipments from the mills aggregated about 10,000 tons more than production during the year, so that on December 31 mill stocks were 10,000 tons less than a year earlier.



NEWSPRINT PRODUCTION, UNITED STATES, CANADA AND NEWFOUNDLAND, 1914-1944

Exports from Canada Declined

Exports of newsprint paper from Canada last year are reported by the mills to have been 2,813,000 tons or 94% of production. This was only 3,000 tons less than they exported in 1943, but there was a substantial shift in destinations. In 1944 Canadian overseas shipments were 384,000 tons, compared with 267,000 tons during the preceding year. Correspondingly there was a decrease of 120,000 tons in mill shipments to the United States, the 1944 total being 2,430,000 tons compared with 2,550,000 tons in 1943.

Exports from Newfoundland were 7,000 tons more last year than in 1943, but here also there was a decided shift. Overseas shipments in 1944 amounted to 170,000 tons compared with 132,000 tons a year

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earlier. There was a corresponding decrease of 31,000 tons in shipments to the United States.

Exports of newsprint paper from the United States last year were static, approximately 15,000 tons, the same as a year earlier. It must be remembered that these are mill reports and that when official reports of newsprint exports are released by Washington they will undoubtedly be much larger because of the wide classification used by the Department of Commerce.

Taken altogether, the North American mills supplied 568,000 tons of newsprint to hungry customers beyond the continental borders in 1944, or 155,000 tons more than in 1943.

Imports Estimated at 2,530,000 Tons

Imports of newsprint paper into the United States were apparently 2,530,000 tons in 1944 as indicated by the mill shipments from Canada and Newfoundland. There was no other source of supply during the year. When official figures are released at some later date by Ottawa and Washington, they may not correspond exactly with those used here because of a frequent time lag.

Publishers' Stocks Declined

The publishers reporting to the A.N.P.A. had 24,000 tons less newsprint on hand or in transit on December 31, 1944, than they had a year earlier. With mill stocks 10,000 tons less, a decrease of 34,000 tons in visible supply is thus accounted for. Unaccounted for is an uncertain quantity held by smaller publishers and other users of newsprint whose tonnage must be estimated because of inability to obtain accurate statistics. Altogether, however, there was very close correlation of consumption with production during the year. At the end the publishers still had on hand a fairly comfortable supply in the aggregate, their stocks amounting to 52 days' consumption at the current rate.

Consumption Declined 14% Last Year

The publishers reporting to the A.N.P.A. used 14% less paper than in 1943, 17% less than in 1942 and 20% less than in 1941. Since the undertaking at the first of the year was to use about 20% less than in the base year of 1941, it will be seen that that goal was attained.

The total and per capita use of newsprint paper in the United States for which satisfactory figures are available during the past 10 years are approximately as follows:

Year	Population	News Print Tons	Paper Used Per Capita
1935	127,521,000	3,300,000	51.7 lbs.
1936	128,429,000	3,650,000	56.8
1937	129,257,000	3,830,000	59.3
1938	130,215,000	3,458,000	53.1
1939	131,878,000	3,550,000	54.1
1940	132,817,000	3,730,000	56.2
1941	133,923,000	3,930,000	58.7
1942	134,633,000	3,800,000	56.4
1943	136,497,000	3,650,000	53.5
1944	138,101,000	3,250,000	47.1

It will be noted that the per capita dropped to 47.1 pounds in 1944 or the least since 1933. But that is the way the tonnage divides out, using the Bureau of Census population figure of 138,101,000. There were so many people in the services abroad however, that the actual use by those at home must have been quite a little above the indicated average.

Restrictions Decreases Sizes

Last year's restrictions in the use of newsprint paper were directly reflected in decreased sizes of publications since circulations went in the other direction.

The leading daily newspapers in the 100,000 circulation and over class which have been checked for 25 years, averaged 23 pages in size in 1944. This was not only 3 pages less than in 1943 but also the smallest in any year since 1921. There was a corresponding reduction in the size of Sunday issues. Last year's average was 68 pages compared with 10 pages more in 1943 and 20 pages more in 1941. The Sunday papers in 1944 were the smallest of any year in our record.

Circulations of Paper Increase

The annual complete compilation of newspaper circulations in the United States, based upon required reports to the Post Office Department in Washington, has been delayed until some time in February.

In the meantime *Editor and Publisher* has compiled ABC statements of 249 daily and 143 Sunday newspapers which show nearly 3% increase in daily circulations and under 1% increase in Sunday circulations during the six-month period ending September 30, 1944, compared with the corresponding period in 1943. It is estimated that this compilation covers about two-thirds of the daily circulations and three-quarters of the Sunday circulations. It is certain, therefore, that total newspaper circulations are being maintained at all-time high levels, and going a little higher. The same source estimates that the American reading public pays more than $600,000,000 annually for its newspapers. The fact is also noted that with higher subscription rates there is a greater net revenue per subscriber than ever before.

Despite the competition of other media, the course of world events makes certain that there will be large newspaper circulations for a long time to come.

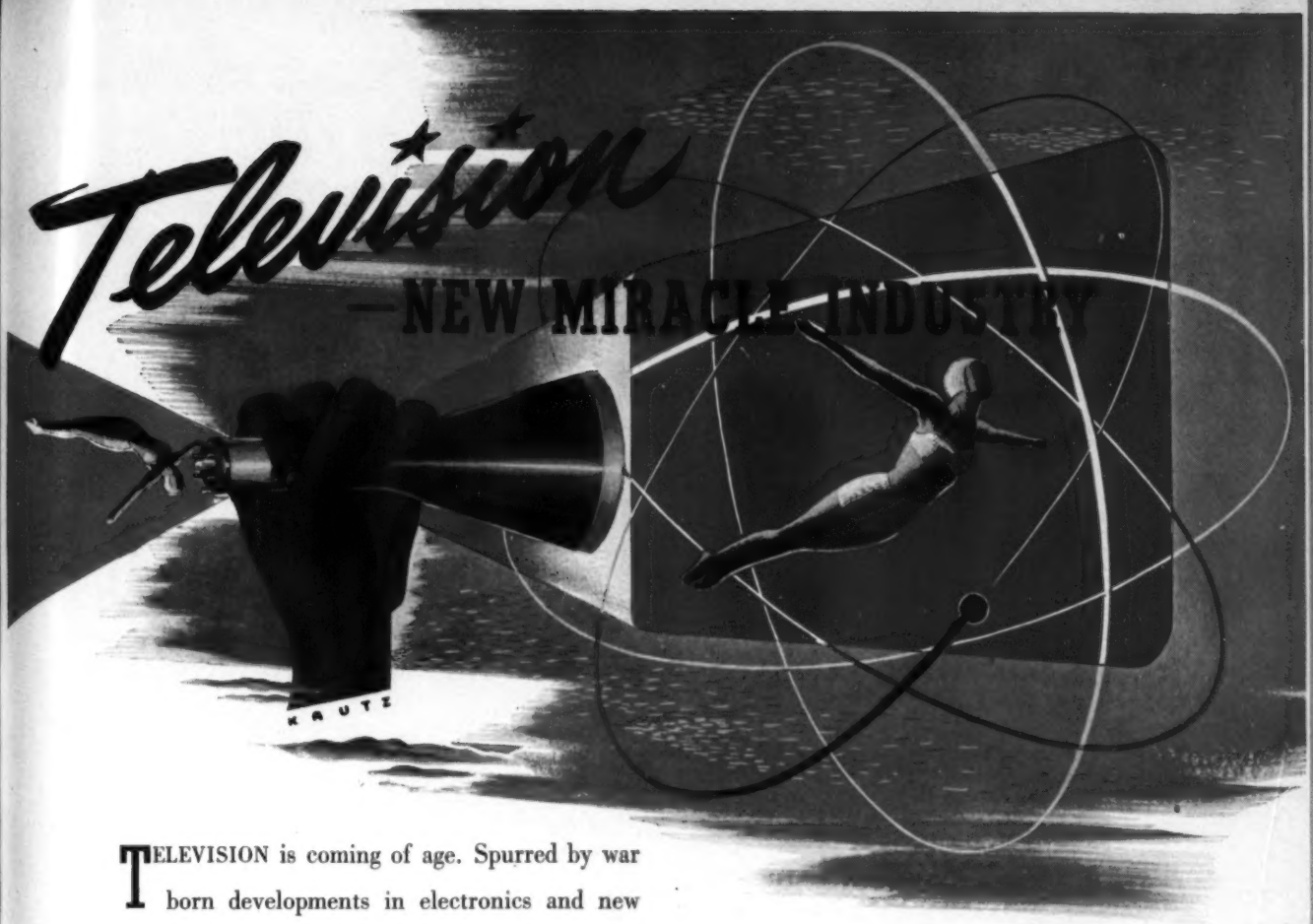
Advertising Lineage Well Maintained

The same old story prevails in the advertising field —a small decrease in newspaper advertising and a large increase in periodical advertising, and a still larger one in radio advertising. The reason therefor is, of course, well-known to all students of the industry. Newsprint restrictions and the pressure for publication of world-shaking events have drastically reduced the space available for newspaper advertising. Magazines, because of their content and time of publication, are under less pressure to record current events, while radio is still free to jam the ether with every kind of sales and promotional talk that the public will stand for.

Newspaper advertising started off the first three months of 1944 with small but substantial gains over the preceding year. Since then however, it has been an entirely different story. The twelve months, according to the Media Records compilation for 52 cities, add up to a decrease of 3%. Under the circumstances it is submitted that the newspapers did pretty well to make available almost as much advertising space as in the preceding year.

Last year's newspaper advertising, however, even if disappointing to the publishers because of their inability to take more, was 15% larger in volume than in 1934.

Periodical advertising had linage gains ranging from 7% in December up to 39% in February over the corresponding months in 1943. The year's aggregate was a gain of 22%. There was also a gain of 71% over 1934, or a very substantial comeback from the Great Depression.



TELEVISION is coming of age. Spurred by war born developments in electronics and new technical refinements, the miracle of images broadcast through the ether is now emerging as a new and unique medium of communication and expression. It promises some day to be as commonplace as the radio and the printed page.

Behind this new miracle industry lie many decades of research and technical achievement. Its beginnings go far back into the genesis of radio itself and the first projection of sound waves. For the principles upon which television is based are formulated upon the work of pioneer scientists who first discovered the physical nature of sound and light. Thus, to those who labored long ago, as well as to the modern technicians who gave television concrete reality, we owe a debt for creating the "Margin of Experience" for the final achievement.

In every field of science, commerce or industry, this "Margin of Experience" proves again and again to be a factor vital to success. Niagara offers it in the field of electro-chemical products. For Niagara has pioneered constantly in the development, improvement and adaptation to new uses of Liquid Chlorine, Caustic Soda, Caustic Potash, Paradichlorobenzene and Carbonate of Potash. Rely on Niagara's "Margin of Experience" for greater success in the use of these products.

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ADVENTURES IN THE "MARGIN OF EXPERIENCE"

Radio goes merrily forward. Statistics are notoriously late for radio publicity, but the trade journals estimate that the gross billings of the major networks totaled $190,000,000 in 1944. Those billings were $152,800,000 in 1943, so a gain of 24% is indicated. It will be some time yet before estimates are available for non-network and local stations, but they undoubtedly had increases also.

Since it is estimated that the total expenditure for radio publicity in 1943—including time, talent and follow-up—amounted to $325,000,000, it seems likely that the corresponding expenditure in 1944 was in the neighborhood of $400,000,000.

Substantial efforts are now underway for the promotion of the use of frequency modulation and television for sales purposes soon after the close of the war. The ether waves will therefore continue to be the medium of the newspapers' greatest competitor in the field of publicity.

Like everything else, the whole outlook for newsprint is conditioned by world war and the effects thereof will last for some time after the close of hostilities. For an indefinite period ahead there is an indicated demand for every ton of newsprint that the North American mills will be able to turn out. The demand will be large when the brakes are off and it will take some time for the accumulation of raw material so that the mills can turn out the quantity that a world of people hungry for news will want. There is much bare machine capacity, but that is only part of the story. The cutting and transportation of wood in northern forests takes time even under the most favorable conditions. There will be labor to be recruited and many repairs and improvements to be made in mills which have long been unable to make them. No such crazy situation is in sight after the close of this war as occurred in 1920, but it is obvious that there are busy times ahead.

Demand For Many Papermaking Chemicals Continues Heavy Throughout Year

Written Expressly For the Annual Review Number of the PAPER TRADE JOURNAL.

A new high production record was established by the American chemical and allied products industry in 1944. The value of chemical products was $8,300,000,000, which was more than double that of 1939. The index value of manufacturers' shipments rose to the high point of the year in October, at 229, compared with a low of 208 in January. This compares with the October high of 284 for all industries, and a low of 264 in January, 1944. The index of the value of manufacturers' inventories rose to a high of 164.2 in July, 1944, compared with a low of 154.2 in November. This compares with a high of 179.1 for all industries in January, 1944, and a low of 170.8 in November, 1944. All alkalies were in very heavy demand in 1944. The manpower shortage was the major problem. Shipments were frequently delayed in packaged lots because of lack of labor. Deliveries of bulk lots were generally quite prompt. Prices under OPA schedules remained stable with few changes.

Blanc Fixe

Consumption of blanc fixe was reported moderate in 1944. Prices remained stable without change throughout the year. Quotations were $40 per ton on the pulp form, in barrels, at works. The powder was quoted at $60 per ton, at works.

Bleaching Powder

Demand for bleaching powder was heavy throughout the year. The supply situation was generally satisfactory. Prices were stable. Quotations remained unchanged at $2.50 to $3.10 per 100 pounds, in drums, car lots, f.o.b. works.

Casein

The domestic production of casein in 1944 was estimated at 15,000,000 pounds against a normal production of 50,000,000 pounds. The trend in this production is still downward and it is estimated that no more than 10,000,000 pounds will be produced in 1945.

It is estimated that some 50,000,000 pounds of casein was imported from Argentina. Stocks on hand at the end of the year were fair, probably sufficient to take care of consuming industries for four months. It is estimated that imports from the Argentine during 1945 will be higher and may total 55,000,000 pounds. Prices were steady throughout the year.

The domestic casein sold between 22 and 24 cents per pound, f.o.b. producing plant.

Argentine casein sold at prices between 16 and 19 cents per pound, f.o.b. port of entry.

Paper mills were permitted to use during the year what they needed. The bottleneck was not casein but pulp supplies and labor.

Caustic Soda

The year opened with a continued heavy demand for caustic soda and tight supply situation. Shipments were somewhat delayed in late January, but in March 1944 deliveries were large. As production increased the situation became easier in April and deliveries were reported improved in June. Heavier government demands in October tightened up the market. The market remained tight during the remainder of 1944, with production at a high level and an increasing ordnance demand. Prices remained unchanged. Quotations were $2.30 for the solid, and $2.70 for the flake and ground, per 100 pounds, in drums, car lots, f.o.b. works.

China Clay

Consumption of china clay continued at below pre-war levels, as the war program restricted the output of coated papers. Prices remained stable throughout the year, at from $7.50 to $15 per ton on filler clay; $12 to $22 per ton on coating grades, f.o.b. mines. Quotations on imported clays ranged from $13 to $25 per long ton, ship side.

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Chlorine

The supply situation in chlorine was fairly satisfactory in January, 1944, under a very active demand. High production was well balanced under the allocation program in effect, with all essential requirements met. A relatively tight market developed in late June. In the final quarter the paper industry was allocated 43,196 tons. All-over demand continued heavy at the end of the year. Prices were unchanged at $1.75 per 100 pounds, in single-unit tank cars, f.o.b. works.

Rosin

Rosin supplies became quite short during the year 1944. It is feared that some time in 1945 rosin will have to go under Government control.

We started 1944 with an estimated inventory of 1,200,000 drums. Production was estimated at 1,500,000 drums, while consumption and Lend Lease took 2,207,000 drums. This left an inventory of approximately 500,000 drums.

It is estimated that production in 1945 will be no higher and possibly lower than 1944. Consumption and Lend Lease demands will be just as high, therefore, the country faces a possible shortage of 400,000 to 500,000 drums.

Prices advanced during the year and for common grades used in the paper industry, such as G, reached a ceiling of $5.79 Savannah basis. FF Wood became quite short during the year and late in 1944 a ceiling of $3.50 was placed on this grade. During the year, producers of rosin size for the paper industry were able to ship all requirements on time.

Salt Cake

Mill consumption of salt cake continued moderate under the restricted kraft paper production program of around 75% of capacity. Quotations were unchanged for the year as follows: domestic salt cake, $15 per ton; chrome cake, $16 per ton, in bulk, car lots, f.o.b. shipping point.

Soda Ash

The year opened with the demand for soda ash active and the supply situation fairly good. Lack of manpower to package bagged shipments began to be experienced more acutely in the latter part of February, 1944, and the market became tight. Demand increased in the third quarter and in October production was reported good and demand in excess of supply. In November, bagged shipments were again delayed by labor shortages. At the end of the year, production was at capacity and less delay was reported in bagged lot shipments. Prices continued unchanged through 1944 and were as follows, per 100 pounds, car lots: $.90, in bulk; in paper bags, $1.05; and in barrels, $1.35.

Starch

At the opening of the year receipts of cash corn were arriving in moderate volume, and the market continued relatively tight. Lack of freight cars delayed shipments in the latter part of the first quarter. Limited shipments continued until the end of May when more market corn became available. Demand continued heavy and the industrial supply was uncertain in October. A record corn crop in 1944 brightened prospects in November. At the close of the year the market supply was relatively large.

Prices on starch at the opening of the year were $3.10 on pearl, and $3.20 on powdered starch. Prices were raised in February to $3.72 on pearl and $3.82 on the powdered grade to balance higher grain prices. All prices, per 100 pounds, car lots, f.o.b. Chicago.

Sulphate of Alumina

Demand for commercial sulphate of alumina continued at a higher rate during 1944. Paper mills were unable to build up any sizable inventory. All alum products, including the basic material for alum, namely Bauxite Ore, was under direct allocation and control during the year and will probably continue so for the duration of the war.

Prices on commercial alum were firm during the year with an upward tendency.

Iron free sulphate of alumina remains quite scarce. Limited supplies are being made. Prices continue firm with some price increase permitted by the OPA.

Sulphur

Sulphur prices were stabilized throughout the year. Demand was heavy. Supply was abundant. Prices continued unchanged as follows: annual contracts, $16 per long ton, f.o.b. mines; contracts at Gulf Ports, $17.50 per long ton.

Talc

Consumption of talc in papermaking grades was only fair in 1944. Prices continued unchanged. Domestic grades were quoted at from $16 to $21 per ton; Canadian talc, at $24 per ton. All prices in car lots, at mines.

Use Less Newsprint

Daily newspapers reporting to the American Newspaper Publishers Association consumed 185,193 tons of newsprint paper in January 1945 compared with 194,690 tons in 1944; 226,741 tons in 1943 and 229,799 tons in 1941. This was a decrease in January 1945 under January 1944 of 4.9%; a decrease under January 1943 of 18.3% and a decrease under January 1941 of 19.4%. The year 1941 is the base for calculating allowable use by newspapers.

The total estimated newsprint consumption in the United States for January 1945 was 255,439 tons which includes all kinds of uses of newsprint paper. The ANPA is using 72½% instead of 75% as more accurately representing the part which newsprint consumption of the ANPA reporting group bears to the estimated consumption total of 100% by all users. For users besides newspapers 27½% is added to bring the estimated newsprint consumption total up to 100%.

The socks of newsprint paper on hand with newspapers reporting to the ANPA was 54 days' supply at the end of January 1945 which was an increase of 2 days' supply from 52 days on hand at the end of December 1944.

Berkshire Cellulose Corp. Formed

The Berkshire Cellulose and Paper Corporation, 86 North street, Pittsfield, Mass., has been formed in Massachusetts and has established a paper converting business. The company is not as yet actually doing its own manufacturing and will not do so until it has acquired the necessary machinery which will take several months. In the mean time it is having paper articles made for it which it assembles and sells from Pittsfield. The officers of the new company are George E. Soyka, president; Leon Mohill, treasurer and Lincoln S. Cain, clerk.

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Clean, square-edged rolls of Hammermill Bond produced on Langston Type "AA" Slitter and Roll Winder

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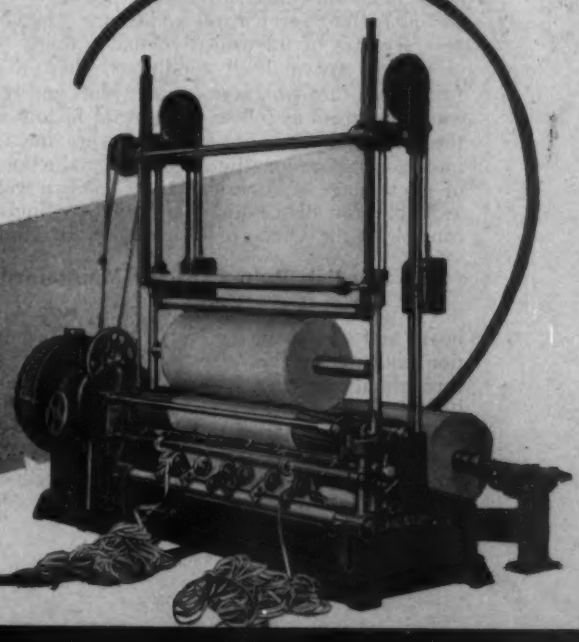

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SLITTERS AND ROLL WINDERS

Production of Wood Pulp Is High in 1944 But Inadequate to Meet Rising Demand

By O. F. Swanson, Gen. Mgr., J. Andersen & Co., and Vice Pres. Pulp & Paper Trading Co.

At the beginning of 1944, people wished one another a Happy New Year as customarily, although they were well aware that the new year would bring sorrow, tragedy and bitter losses to numerous human beings. Yet we adhered to the proverbial custom of exchanging holiday greetings as in the past when circumstances and prospects were brighter.

And, why not? Extending holiday good wishes certainly cannot do any harm. We, affiliated with the wood pulp and paper industries, indulged in wishful thinking on a broad scale and made predictions in full conformity with our expectations, which were without the slightest basis of fact, being predicated on unfounded rumors concerning the possible early termination of the war in Europe.

This gave rise to the supposition that several hundred thousand tons of urgently-needed prime quality Swedish sulphite and kraft pulp would be rushed pell-mell to eager American consumers. The glee of this prospect in consuming circles abated somewhat when it was learned that Sweden had sold, or made arrangements for deliveries to England of approximately 300,000 tons of pulp and, as the war was viciously waged throughout 1944, there was of course no exports of wood pulp from Sweden to the American market last year.

What effect this anticipated sizable tonnage of Swedish pulp would have on the distribution of American and Canadian wood pulp puzzled producers on this side, but not too much. On the other hand, consumers were much elated over the prospect of receiving additional pulp, and cared little from whence it came, so long as they could get it. When nothing materialized with regard to pulp from Sweden, it is reasonable to assume that producers on this side of the Atlantic felt somewhat relieved, and, by the same token, consumers were keenly disappointed. The latter were obliged to tighten their belts by another notch or two to prepare themselves for a further stretch of endurance. Having had several years of intensified combat training to carry on under any and all conditions, they were well fortified to face whatever future events and restraints compelled them to follow. Important factors to assist them in their fight for existence were the fair and intelligent allocations by the War Production Board of the tonnage of American and Canadian wood pulp available for distribution, and the continued price control by the Office of Price Administration.

Swedish Pulp Capacity Maintained

For several years prior to 1944, very little was heard and said about the North European pulp situation, but since this question loomed off and on throughout last year, it seems fitting to comment on it here. The productive capacity of the Swedish pulp mills has been reported to have been fairly well maintained during the war period, although the Swedish pulp producers have suffered a sharp decline in exports of their product.

The quality has been kept up, and is believed to excel even pre-war standards, this being reported to be particularly true with respect to grades of high alpha content such as rayon and dissolving pulp. This indicates that pulp mills in Sweden are in fit condition despite their reduced production. To what extent they have reduced their output is not definitely known, but it is understood to be approximately 50%. Shortages of manpower and raw material — coal, chemicals, etc. — and the total loss of their principal export markets — Great Britain and the United States — since Sweden has been completely isolated from the very beginning of the war, are contributing factors in the reduced production. It is probable that production can be increased rapidly following the opening of the shipping lanes provided the diminished supply of pulpwood does not interfere.

The question frequently is asked how Sweden gained its prominent position in the woodpulp producing industry. Perhaps it is because the first sulphite pulp mill in the world was built in Sweden—at Bergvik, the home of the famous Goat Brand unbleached sulphite and, perhaps, too, because of the country's natural resources for manufacturing high qualities of pulp at comparatively low costs. The wood is most suitable, and the rivers, large and small, in Norrland (about one-third of the country) where the large export pulp mills are situated, are salient factors in the development of the pulp industry in Sweden.

Then, of course, there are the British and American markets, without which the huge industry would never have attained its present dimensions. These markets have contributed to a large degree to the expansion and success of the Swedish woodpulp industry. Unquestionably, skill, perseverance and ingenuity also have played their part, because they have led to a quality of pulp which has been recognized for decades as of the highest. What we, in this country, refer to as news grade sulphite is practically non-existent in Sweden, except in cases where the newspaper mills control the pulp mills, and manufacture and use their own pulp, either in lapped or slushed form.

Course of Transition Period Uncertain

No one can predict what course the Swedish pulp mills will choose to pursue during the transition period, but it is logical to assume that they will strictly adhere to their former policy of concentrating on quality. Further improvements here and there, in the mills and in qualities, probably will be made whenever feasible without endangering the price structure by unbearable increases in costs of manufacture. Research and inherent developments in dissolving pulp and specialty grades to facilitate the widest distribution possible and to keep customers at minimum sales cost will, without doubt, receive utmost consideration, careful attention and scrutiny.

Apparently there is very little that can be said

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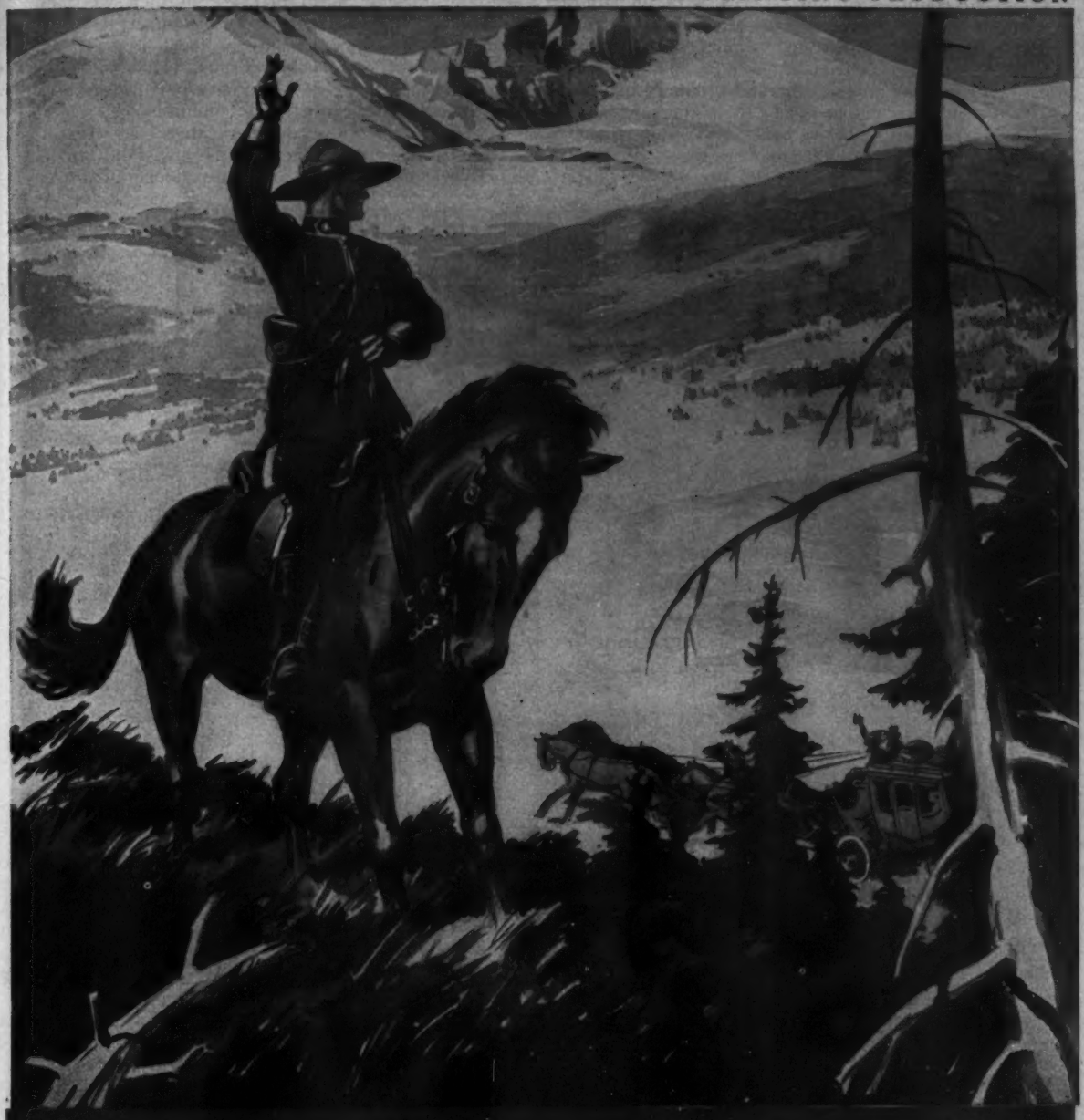

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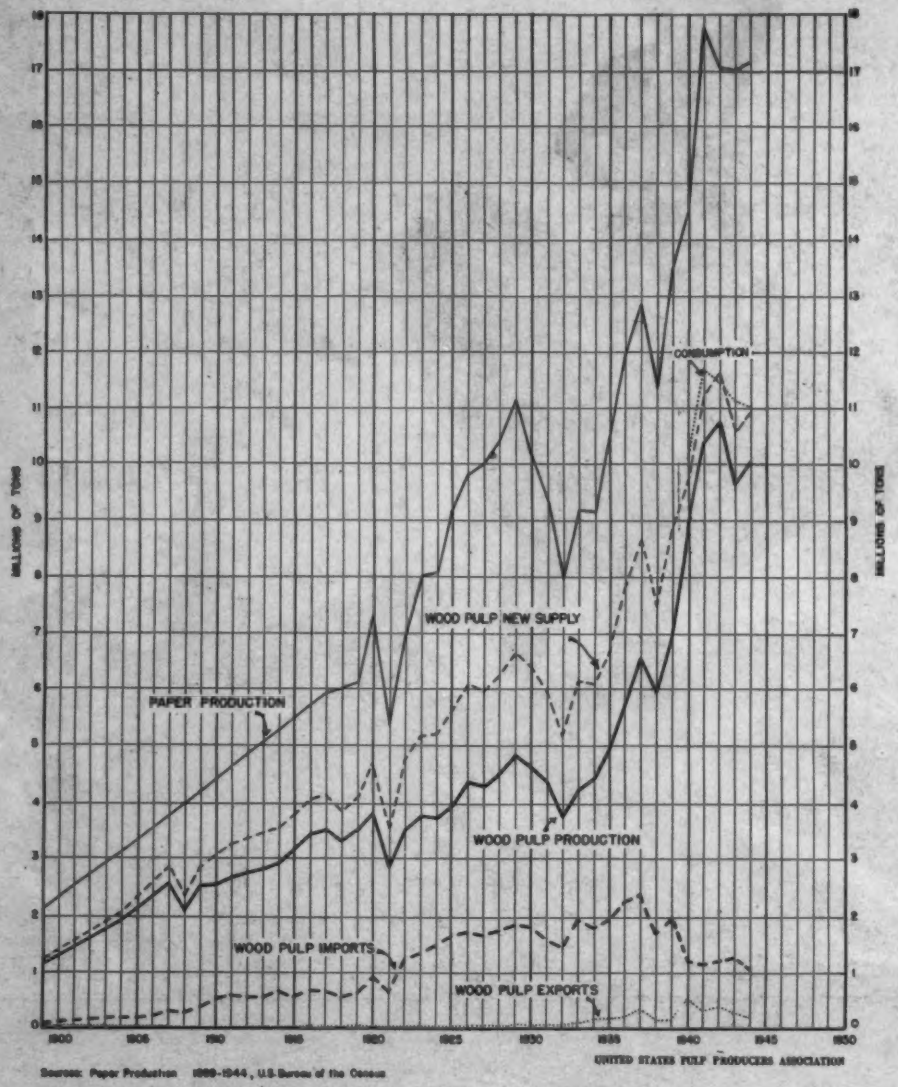
THE NORTHWEST PAPER COMPANY • CLOQUET, MINNESOTA

about Norway and Finland as well as the other pulp producing countries of Europe because of the almost complete dearth of reliable information concerning pulp mills in those unfortunate countries. Both Norway and Finland always had fine pulp mills since the very inception of pulpmaking, and produced qualities of wood pulp second to none. It is sincerely hoped that these countries will be back in the pulp production picture in the not distant future.

During 1944, and several years previously, almost



TOTAL UNITED STATES PRODUCTION OF WOOD PULP AND PAPER AND NEW SUPPLY, CONSUMPTION, IMPORTS AND EXPORTS OF WOOD PULP, 1900-1944

any kind of wood pulp was cheerfully accepted by users in the United States and everywhere and, unbelievable as it may seem, results obtained were generally so satisfactory that they served to surprise even the papermakers themselves. What paper manufacturers were obliged to make paper from last year would never have been given the "Go" sign by their laboratory staffs under normal conditions. But, papermakers were forced to knuckle down and make up their minds to get along with the raw materials at their disposal and produce good paper anyway. Utmost skill was required and diligent application by both technicians and practical mill men were imperative. Whenever necessity, accompanied by determination to conquer, rules the roost, we can rightfully look for great achievements. Hats off to you board and papermakers! You have performed an excellent job, under most trying conditions.

It is our surmise that papermakers have learned quite a few new tricks in manufacturing and besides, as American and Canadian pulp producers have entrenched themselves very firmly in this market there should be no apprehension on their part over their ability to compete in the future with European producers. They have consolidated their position against whatever eventualities may be encountered when competition returns. This is largely due to improvements they have made in the quality of their pulp, and also to the genuine spirit of cooperation with consumers which they have displayed over many years and especially the last few years.

Pulp manufacturers who, for unavoidable reasons,

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products for the paper industry

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- Nitric Acid
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- Sodium Sulfite (Anhydrous)
- Sodium Bisulfite (Solution or Anhydrous)
- Sodium Hyposulfite
- Salt Cake
- Epsom Salt
- Nitre Cake
- Aluminum Sulfate (Standard and Iron Free)
- Crystal Alum, Potassium
- Sodium Aluminum Sulfate
- Sodium Silicate
- Sodium Metasilicate
- Trisodium Phosphate
- Tetrasodium Pyrophosphate
- Disodium Phosphate

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Making quality paper depends to a large extent on the quality of the chemicals used. General Chemical Aluminum Sulfate, for example, either in the Standard or Iron Free grades, will help maintain quality in your paper from the start. General Chemical's carefully controlled production methods insure "Alum" of uniform quality and concentration, and a low percentage of impurities.

Next time, specify these quality General Chemical products for *your plant:*

ALUMINUM SULFATE

Standard—Lump, Ground 99% thru 8 mesh, 95% thru 10 mesh; Powdered, 95% thru 100 mesh.

Iron Free—Lump, approx. 2½"; Ground, thru 8 mesh.

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Solutions: from 38°—60° Baumé
Appearance: Opalescent to clear
Wt. Ratio (Na_2O to SiO_2) from 1:2.00—1:3.40

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In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

20-ft LOGS to CHIPS

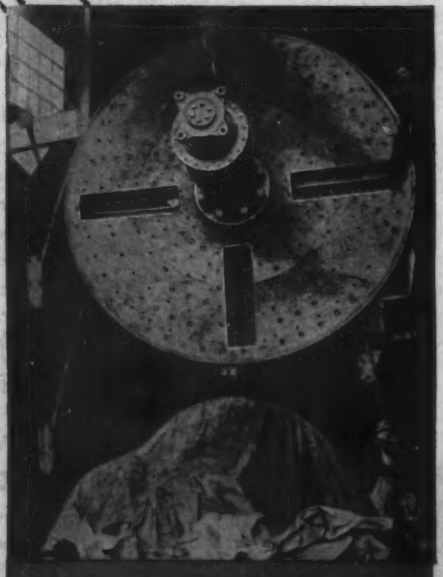
This chipper, which is being driven by a 1000-hp wound-rotor motor at 240 rpm, "eats" logs up to 40 inches in diameter at a maximum rate of one foot a second. It indicates the wide range of motor-drive installations that General Electric has engineered to the special needs of the paper industry.

Four 48-in. knives are carried on the big 14-ft disk of the chipper, which is 10 inches thick. The disk's flywheel effect helps reduce power peaks—but there's still a sudden shock and shudder as logs up to 40 inches across come in against the spinning blades. The motor must withstand shock and sudden load changes. In an 8-hour shift, chips for 275 tons of sulphite pulp are produced.

The control system (Fig. 1) helps the wound-rotor motor to meet the peak loads which come with logs of large diameter. It provides smooth starting and "plugging" for prompt stops.

The wound-rotor induction motor has the advantage of limiting any sudden power increase to 500 kw (Fig. 2). Under other circumstances, the choice might go to a synchronous motor, which has somewhat higher efficiency and affords power-factor correction. Decisions like this are typical of those which G-E application engineers are prepared to help you make, based on an understanding of paper-mill technology along with electrical engineering.

General Electric Company, Schenectady 5, N. Y.



Chipper disk shown before installation. The wheel is 172 inches across and 10 inches thick.

BUY ALL THE BONDS YOU CAN—*and keep all you buy*

G-E 1000-hp (240 rpm) wound-rotor motor as applied to pulp-mill log chipper of a west coast company.

. . . IN 20 SECONDS!

HOW G-E MOTOR CONTROL HELPS CHIPPER TO HANDLE LOGS 40 INCHES IN DIAMETER *Motor starting* is accomplished by closing contactors C, B, and A (in that order), shown in diagram at right. During normal runs, contactor A remains closed, leaving 6 per cent fixed resistance in the circuit. Under this arrangement, logs up to 30 inches in diameter are handled.

If a long 40-in. log comes into the chipper, the disk and motor will decelerate under the overload until the motor is taking about 180 per cent normal power. Then a notch-back relay opens contactor A, and disk-and-motor speed is further reduced by means of 12 per cent resistors until the maximum load peak (some 1300 kw) is again reached. At this point, a relay operates to stop the feed rolls, holding the logs back from the blades until the disk is brought back up to normal speed.

The chart below shows a typical operating cycle for a log 36 inches in diameter and about 16 feet long.

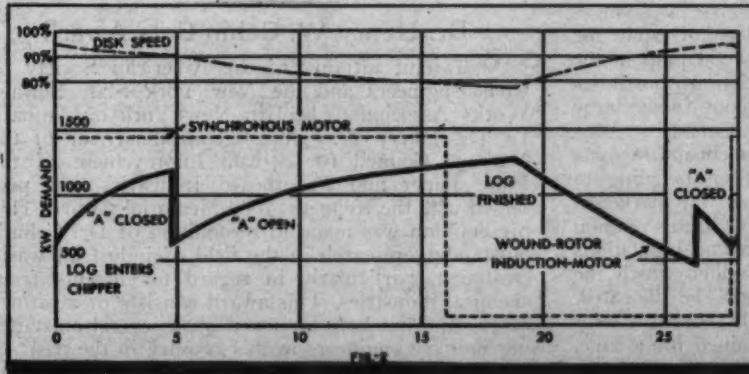


FIG. 2

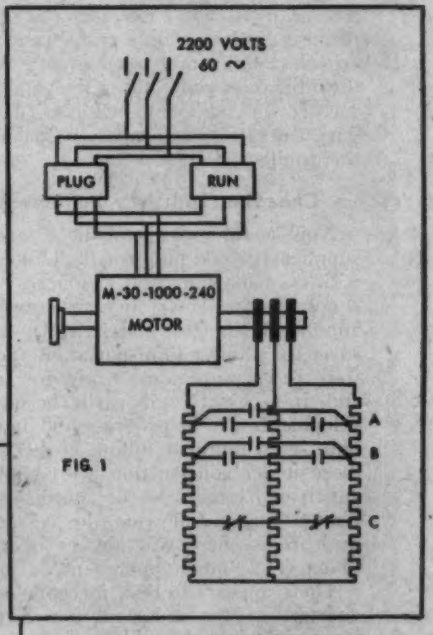


FIG. 1

GENERAL ELECTRIC

PAPER-MILL DRIVES

were unable to procure the necessary new equipment for improving their mills and, consequently, their product, nevertheless have done their share in keeping the wheels of the American paper mills turning. By their splendid, all around cooperation, the American and Canadian pulp producers have earned a cozy niche in the hearts of American consumers of pulp which they undoubtedly will retain for many years if not always. However, don't be discouraged, you pulpmakers in other parts of the world because, regardless of sentiments pro and con, "quality" will again be the password when the war is over. Moreover, do not worry about prices, because the OPA will attend to them for a long time. Also, do not lose any sleep over the moth-eaten old cry of "unfair competition," which recently has reappeared in print, and don't waste too much mental or physical effort on plans for establishing post-war business—until the big job on hand has been finished.

Cooperative Effort Conserves Pulp Supply

Trade associations, trade publications and the press rendered valuable service to the industry during the last year, both by their enlightening articles on practical and technical problems and by stressing the importance and necessity of saving, collecting and distributing waste paper for re-use in the manufacture of paper and board. It seems fitting that waste paper should be mentioned here, because of the excellent work done by numerous groups of cooperative people in all walks of life in behalf of the salvage and collection of this vital raw material. It was stimulating to observe the genuine enthusiasm displayed by our school children and other young folks to ameliorate the difficulties confronting the paper and board manufacturers by diligently endeavoring to supply them with sufficient wastepaper to enable them to operate their mills.

Canadian Industry in Favorable Position

Now a few words about Canada as a potential supplier of wood pulp for the United States. To begin with, Canada's natural resources are adequate for supplying the American market with a much larger annual tonnage of pulp; its wood is excellent and so is its water. Transportation facilities, by rail as well as by water, are ready for increased haulage, and, if necessary, can easily be extended. New developments are in progress and new mills are being built, with more to follow in due course as soon as those under construction are completed. Despite the anticipated large sales of Swedish wood pulp in the United States following the cessation of hostilities in Europe, there will always be room for a large tonnage of "quality pulp" made in Canada.

There appears to be a foregone conclusion in some quarters of the industry that Sweden is going to jump right into the middle of the post-war market in the United States, but I do not concur in this opinion because it is my belief that governmental regulations will be continued for some time, under which the available tonnage of wood pulp will be allocated, regardless of the origin of the pulp. Control over prices also seems likely to be maintained for a time.

It would be strange justice indeed if, for any reason whatsoever, Canada was not afforded an even break on future pulp business in the United States, and that is all that Canada seeks. The Canadian pulp manufacturers, however, may be more directly concerned over the future tariff set-up between the United States and Canada than in domestic or European competition. So far, Canada has been the main source of supply of wood pulp during the war period for the so-called converting mills in the United States. As the immortal Al Smith used to remark: "Let's look at the record," and if we do, I feel convinced everyone in the industry will agree that our friendly northern neighbors have done a better job than they were expected to do. In fact, they have performed "wonders."

Foresees No "Dumping" of Foreign Pulp

Prior to the war, Sweden held the enviable position of being the largest supplier of imported wood pulp to the United States. While Canada occupies this role at present, the threat of possible Swedish competition should not be minimized either by domestic or Canadian pulp manufacturers. What other Scandinavian countries may do, eventually, cannot be discussed for reasons already stated. Each of them has its own government and laws, and acts independently of the others, or very much on the same basis as Canada, Mexico and the United States do. In short, one of the group might be in a position to flood this continent with pulp which, by the way, I feel certain will never occur again, while others may have little tonnage to spare for the American market. Consequently, when reference is made to the "Scandinavian" pulp situation, each country in the north of Europe should be dealt with individually, in the same manner as when reports are issued on the United States and Canadian pulp situations.

North America Has Good Production Year

Statistically, the wood pulp industry in both the United States and Canada held its own remarkably well during 1944. Pulp production in the United States last year totaled 10,053,000 short air dry tons, according to the United States Pulp Producers Association estimate, compared with 9,626,705 tons produced in 1943. Canadian production reached an estimated total of 5,070,000 short tons last years, against 5,152,905 tons in 1943. United States imports of pulp were 1,060,000 short tons in 1944, compared with 1,252,000 tons in the year before. Exports from the United States were 184,000 short tons last year, against 263,000 tons in 1943. Approximate United States consumption of wood pulp in 1944 was 10,259,000 short tons against 10,039,000 tons in 1943.

Dr. Henry W. Gehm Gets Award

At a joint meeting of the American Society of Civil Engineers and the New York State Sewage Works Association, held in New York on January 19, Dr. Harry W. Gehm, technical advisor of the National Council for Stream Improvement of the Pulp, Paper and Paperboard Industries was presented with the Kenneth Allen Memorial Award. This presentation was made in recognition of Dr. Gehm's outstanding research in the field of industrial waste treatment, particularly in regard to effluents from chemical industries. This award consists of a bronze plaque and has been bestowed upon several outstanding sanitary engineers in this country in the past. In receiving this honor Dr. Gehm stated that such recognition of industrial waste research pointed to broadening of the field of service for sanitary engineers and indicated the future need for men with sufficiently broad training to enable them to be of increasing service to industry.

IDEAS IN MESH

Du Pont Dyestuffs

DU PONT DYESTUFFS

Kraft Paper Output Increases 1 Per Cent in 1944 Over Previous Year

By Willard J. Dixon, President, Kraft Paper Association

For the last two years the kraft paper manufacturing industry has maintained a relatively stable though depressed level of operation. Production in 1944 showed an increase of only 1% over 1943 with the industry operating at approximately 75% of its capacity.

A year ago it was our forecast that 1944 production would exceed that of 1943 by at least 100,000 tons. The industry fell short of that forecast through no fault of its own. The Pulp Allocation Office of the WPB which controls the production of kraft paper just as it controls the production of all paper and paperboards selected the self-contained kraft paper mills as the major source of additional pulp to meet the expanding needs of the kraft board manufacturers. A major portion too of the kraft pulp needed by the F.E.A. for export came from paper rather than board mills. These inroads into the industry's pulp supplies made our 1944 production estimate unattainable.

The Pulp Allocation Office not only caused shifts of production between this industry and others but also caused shifts within the industry itself. As in the previous year, wrapping paper and grocery and variety bag papers were restricted in volume while multiwall sack paper and such other converting papers as asphalting, creping, gumming, laminating, ordnance wrap, twisting and water repellent papers continued to expand in volume.

Civilian supplies of kraft paper, becoming short in 1943, began actually to disappear as 1944 drew to a close. Housewives and shoppers were asked to do without grocery bags and Christmas packaging. Shortages of civilian packaging materials threaten to become even more acute during the first half of 1945.

Price Control Complete in 1944

The OPA maintained its complete control of prices on all grades of kraft paper during 1944. This was accomplished through MPR No. 129 and MPR No. 182. The former regulation was completely revised during the year, becoming RMPR No. 129 in June. The only change made by RMPR No. 129, affecting this industry, was in respect to the formula for pricing new grades of paper. An important amendment to MPR No. 182 was issued in January 1944 by which the OPA, upon the recommendation of the industry advisory committee, raised the base weight on wrapping paper from No. 30 to No. 40. This enabled the industry to recover a portion of its higher costs on wrapping paper lighter than No. 40 and made a greater quantity of these lighter weight papers available to the industry's customers at a saving in fiber.

It is seldom easy to forecast an industry's prospects a year in advance. With the uncertainties created by the war such forecasting is triply difficult; to guess when the war itself will end, to estimate the time needed to reestablish labor and raw material supplies and to forecast the postwar demands for the industry's products.

Victory in Europe now appears a matter of weeks or at most of months rather than years. Upon the ending of the European War, we may anticipate an increase in wood-cutting operations which in the south and the pacific northwest would immediately be reflected in increased paper production. The paper industry, under such conditions, would undoubtedly be relieved of some of the pressure for deliveries of pulp to the board industry. Certainly pressures originating from the export demand upon F.E.A. for pulp shipments to the Continent would be relieved by the supplies known to exist in Sweden. Demand for nitrating pulp required for conversion into smokless powder would be lessened considerably by Germany's defeat. Although nitrating pulp is derived from a sulphite or bleached sulphate pulp base, it detracts in the latter case from the potential supply of unbleached sulphate pulp. A lesser demand for pulp for nitrating would undoubtedly add to the supplies of unbleached kraft pulp.

Demand for Kraft Exceeds Production

It is not difficult to forecast that under conditions of either war or peace, demand will exceed the industry's productive capacity. War requirements in 1945 have already forced the WPB to make two drastic changes in its first quarter pulp allocations. On January 20 it instructed all converter mills to use 5% less market pulp than had been allocated to them. On February 1st it ordered all manufacturers of grocery bag paper to reduce their consumption of pulp for production of that paper by 10%. These changes increased the demand pressure. Were Germany to surrender tomorrow, at least 150,000 tons of kraft paper would be needed just to replenish the depleted stocks at the mills and the normal inventories of merchants, converters and retail stores.

We know that today's demand for kraft paper under war conditions is in excess of our ability to supply it in full. We also estimate that there is a pent-up demand for kraft paper for civilian consumers that would also exceed supply. Consequently, in either case the demand outlook for 1945 is of capacity proportions.

Despite difficulties due to shortages of fuel, lack of truck tires, breakdowns in transportation and shortages of truck and repair parts, the real problem in the paper industry centers around manpower shortages. These manpower shortages are primarily in the woods. If adequate manpower can be obtained either through improved domestic labor supply or through increased use of prisoners of war, the production of kraft paper could return to near-capacity operations very quickly.

In summary, it is our belief that, whereas the present low rate of operations will continue while Germany remains in the war, recovery could take place very rapidly thereafter. The WPB, however, would probably not be ready to release the industry's pulp entirely for its own use. Our best estimate, therefore, for 1945 production of unbleached kraft paper would be an amount equal to or only slightly higher than the 1944 level.

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Canadian Pulp and Paper Industry Makes Fine Production Record in 1944

By C. L. Sibley, Regular Correspondent, PAPER TRADE JOURNAL

The pulp and paper industry in Canada, in the year just passed, has given another impressive demonstration of what is its chief pride, its greatest achievement, and what it hopes is the best guarantee for its future, namely, that with increasing handicaps in both production and distribution, its performance, under the test of war conditions, constitutes the best guarantee that consumers, and in particular consumers in the United States, can look to Canada as a dependable and fairdealing source of supply.

Few people, even in Canada, have an adequate knowledge of the outstanding importance of the role which the industry has played in the war effort and in the life of the United Nations during the war years. The Government itself did not realize it until the industry, in the summer of 1943, in calling for less stringent application to the industry of the regulations for the call-up of men for the armed forces and war industries, undertook a campaign to prove the "war essentiality" of the pulp and paper industry and the need for immediate action, by releasing manpower to the industry, especially for woods operations, to avert a calamitous shortage of its products. [That it did prove to the Government the industry's "war essentiality" is now history. Sufficient to say, the facts divulged were so sensational that the Government reversed its policy in regard to the industry's manpower, and since then has cooperated in every way possible with the efforts of the manufacturers. Thus during the past year, in order to get a reserve of raw wood, and if possible replenish the depleted stock piles of pulpwood of the various mills, we have seen a woods labor campaign, comprising publicity and advertising, under the auspices of both the industry itself and National Selective Service, supported in public statements by leading officials of the Federal Government and of the Governments of the Provinces in which the industry principally operates.

Paper Demonstrates its Essentiality

The facts relating to the "war essentiality" of the industry are startling. For instance, the industry has proved that it has been the mainstay of a free press in more than 40 countries, constituting the whole of what remains of the civilized world. In addition to supplying the whole of the wartime paper supply for Canadian newspapers and between 70 and 75% of the total supply for the United States, here are some recent figures relating to the wartime supply of newsprint to countries outside North America, the figures showing the percentage of each country's imports of newsprint from Canada:

Country	Per Cent of Imports Supplied by Canada
Argentine	45
Australia	77
Brazil	99
British India and Ceylon	86
Chile	95
Colombia	75
Cuba	90
Eire	100
Great Britain	58
New Zealand	80
South Africa	83
Uruguay	94

In short, during the war years, with the help of two mills in Newfoundland, Canada has been virtually the only source from which the United Nations could hope to import paper for their newspapers, and Canada has maintained this supply, overcoming shortages of men and materials, power shutdowns, strikes, fires, shipping losses and enemy action, mechanical breakdowns and other handicaps. Is it any wonder that, by meeting the severe test imposed on it, the Canadian industry claims it has demonstrated qualities of ingenuity, adaptability and reliability which are an assurance of supply under any conditions?

The Supply of Pulp

In addition to the tremendous quantities of pulp and of paper and paper products which have been essential to the ability of the United Nations to wage war, demands for which have come to the Canadian industry with increasing urgency as the war has continued, Canadian pulps have been essential for nitrating into high explosives, for manufacturing plastics and synthetic fibers, for surgical dressings and for hospital wadding. Canadian paper board is used in place of metal and wood for shell-casings, for packaging gun barrels, ordnance parts and small arms ammunition. Paperboard has also been adapated to other purposes, such as containers for blood plasma and for food and medical supplies. Certain paper products are component parts of sea and land mines, of radio equipment, of shells and other weapons of war. Building board, made from Canadian wood pulp, has been used in place of lumber to speed construction of barracks, hospitals and other buildings. The latest use of Canadian paper has been for the manufacture of ration books for people in liberated countries. Other kinds of paper supplied by the Canadian industry under unprecedented conditions of production and shipment have been book and writing paper for administrative use and for publications, wrapping papers, tissues and special grades.

In response to all these demands, Canada's production of pulpwood in the war years has exceeded the pre-war average by over 33%. Of pulp, in addition to the enormously swollen wartime needs of Canada itself, this country has been the main source of supply for Great Britain, contributing 70% of Britain's total supply, while exports of pulp to the United States have increased between 200 and 300% above the 1938 total, this huge increase coinciding with deliveries of raw pulpwood to the United States which in the past five years of war have averaged about 25% higher than in the five pre-war years.

Supply of Newsprint Larger

In the year just closed Canadian newsprint production, at 2,991,782 tons, was 8,985 tons larger than in 1943, and despite all the factors mentioned, the total production of newsprint was actually larger by 4.3% than the production in the last pre-war year. Shipments to the United States were fully maintained at the rate of 200,000 tons a month, as agreed upon be-

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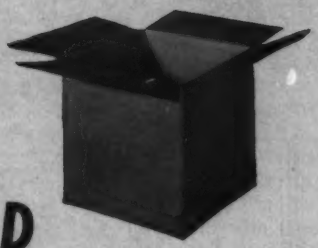

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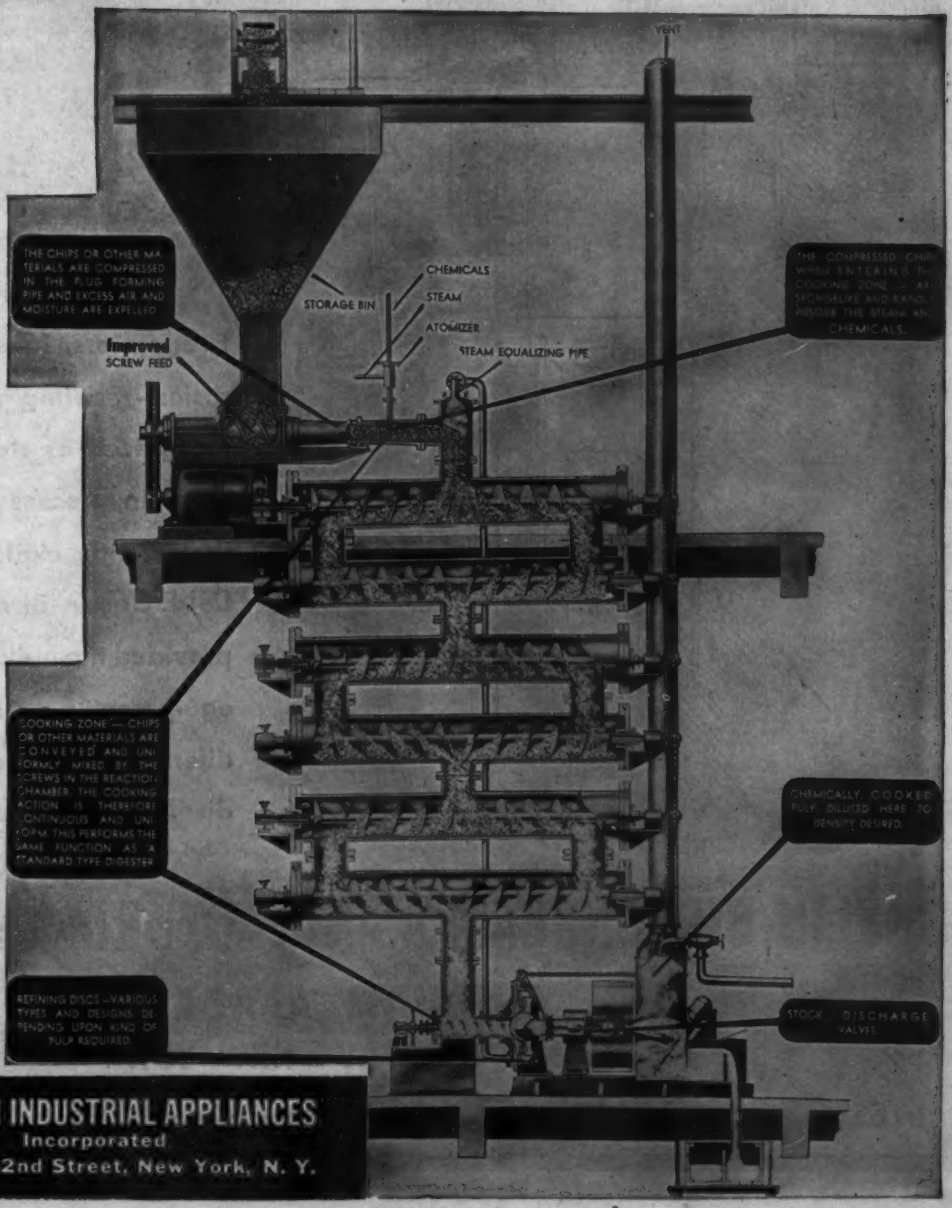
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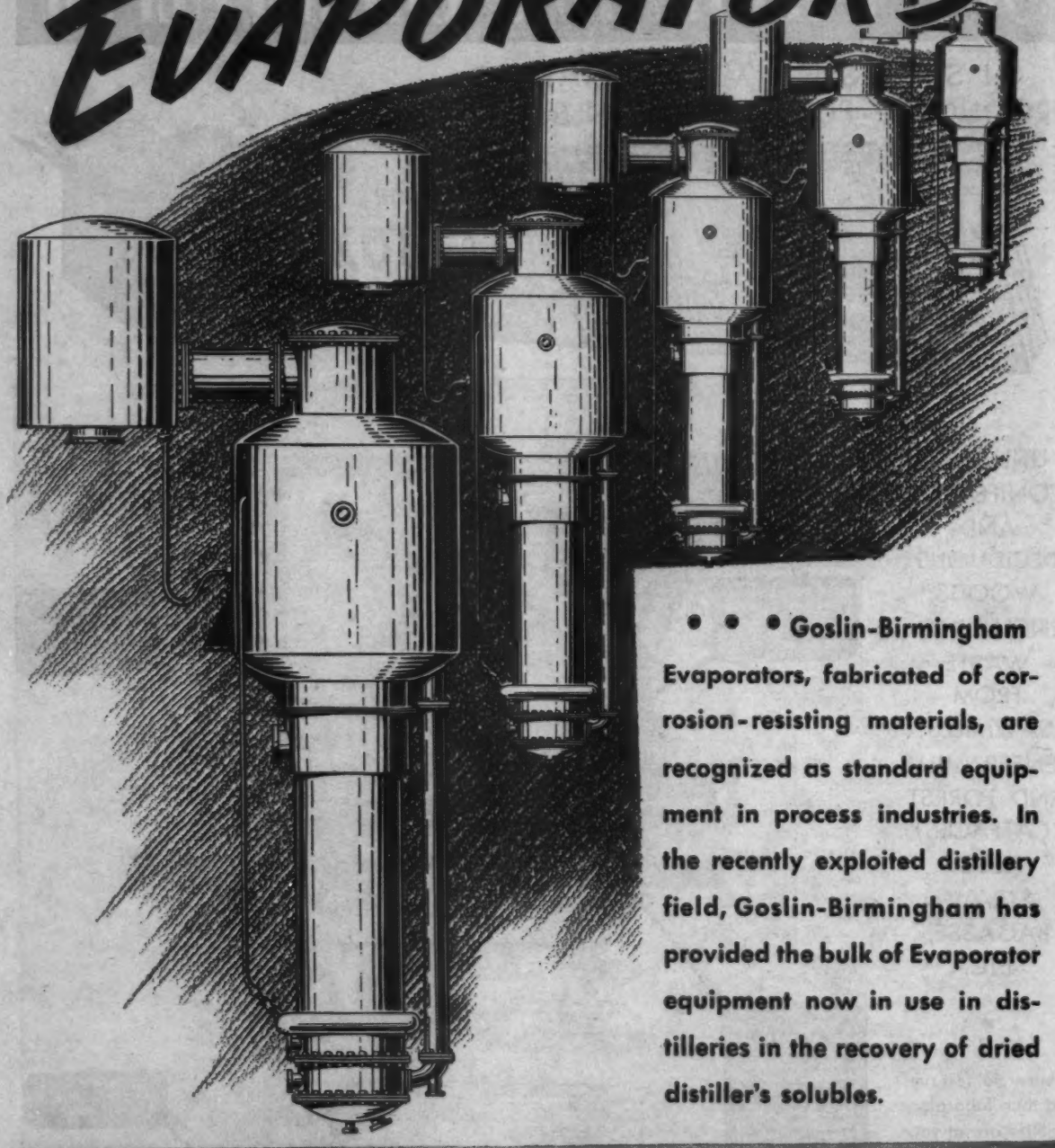

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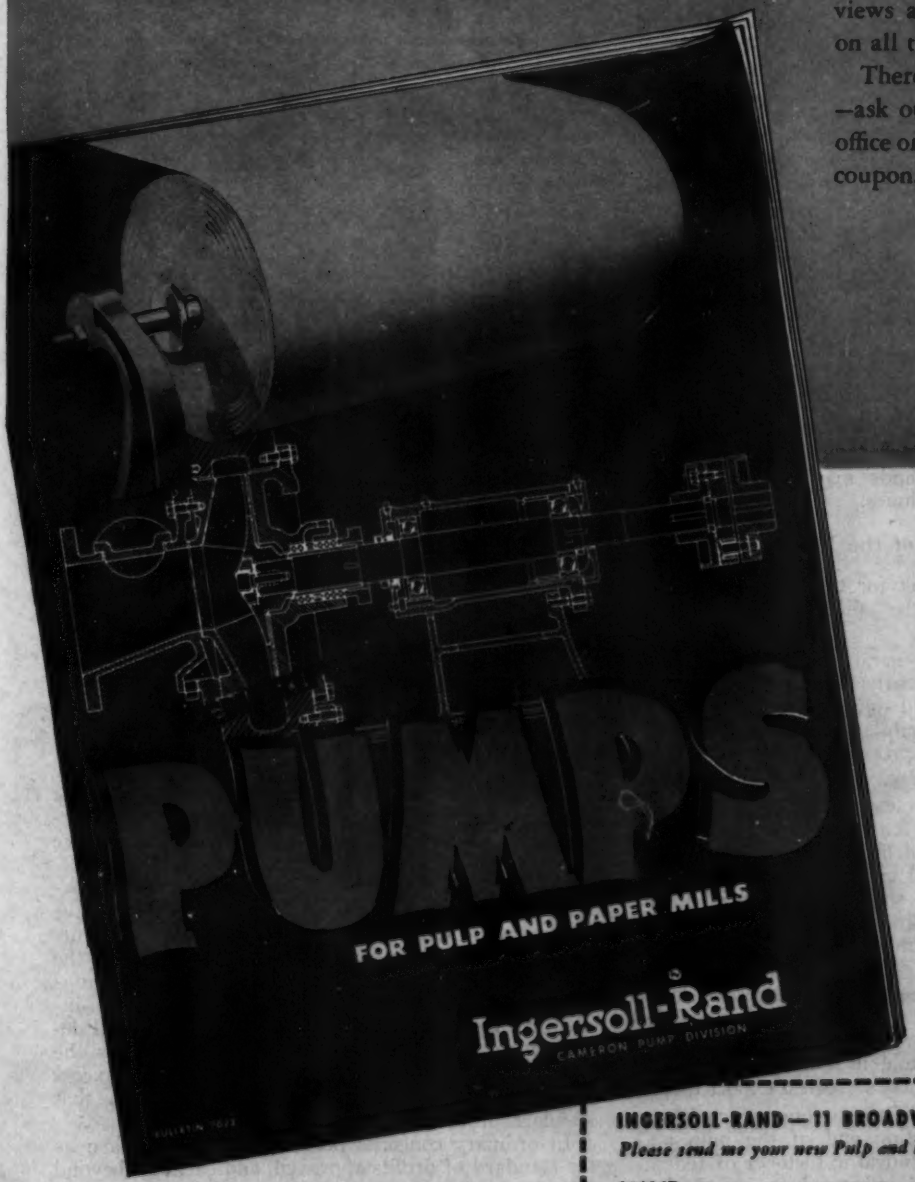

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tween the governmental authorities of both countries, while, in response to urgent requests in connection with the war effort for larger shipments overseas, such shipments, at 383,723 tons, were larger by 116,916 than in 1943.

The year has brought indications of further prospective improvement in both production and distribution, though the industry's greatest difficulty, a shortage of pulpwood due to shortage of manpower, still remains. On this point an official statement on behalf of the producer says: "Blockpiles at the mills, which are the industry's immediate reserves of raw wood, remained roughly at the same level as in 1943, though this was below the figure which would be considered safe or practical in peacetime operations. The diminution of blockpiles which had taken place in previous war years was almost halted by a strenuous and successful campaign to get woods labor for the 1943-44 cutting season and by extreme efforts to get the cut wood to the blockpiles this spring and summer, despite the lowest river levels in some thiry years. Due to low water, some of the expected wood supply has been stranded in rivers en route to the mills. Trucking and other expedients have been employed where possible, at considerably higher costs, in order to get out the maximum supply of pulpwood."

The fact that the supply of labor in the woods this season exceeds by more than 10,000 men those in the woods a year ago, and that active operations began earlier, should mean an improvement in the general pulpwood supply position if good weather prevails. On the other hand, the liberation of European nations has added to the call upon Canada for overseas supplies, and the new demands may increase as the process of liberation continues.

Indications of the Future

In regard to the outlook for the industry, here is another quotation from the official statement above referred to:

"In addition to the general course of the war which, in 1944, pointed clearly to victory, two occurrences in the federal field gave some signs of improved prospects for the pulp and paper industry.

"The first of these occurred early in the year when estimates for the operations of the Department of Trade and Commerce were extended considerably beyond previous limits. The effects of the proposed increase in Commercial Intelligence Service and the proposed development and maintenance of new markets for Canadian goods, should be beneficial to all Canadian export commodities. The pulp and paper industry's relationship to this development is that of the nation's second greatest export business. Only gold surpasses pulp and paper in the peacetime dollar value of exports. In the manufacturing industries, apart from war products which cannot be considered as having a permanent role in Canadian economy, pulp and paper is this country's greatest export factor.

"A second move from Ottawa, one which has a bearing upon the production end of the pulp and paper business, was the removal in October of federal restrictions regarding the industrial use of hydro-electric power. This decision had no effect on 1944 production but should result in freer use of newsprint mill capacity during 1945. It has further significance in that it points to a gradual swing back to normal production operations. The pulp and paper industry is normally the greatest consumer of power of any industry in Canada. There are single newsprint mills, for example, which use more electricity than is needed to light both Montreal and Toronto.

"To meet the urgent demands of war plants the industry at first voluntarily surrendered some of its power. Greater blocks of hydro-power were later diverted to essential war production in Eastern Canada and New York state and newsprint machines were closed down in certain areas. Mills so affected drew upon other mills to supply their consumers. Thus the release of power restrictions should permit a gradual correction of this situation although the greatest limiting factor in pulp and paper production today is shortage of wood rather than of power."

Leaders in the industry permit themselves to be quoted as saying that the immediate post-war prospect for the pulp and paper industry seems relatively bright, and that the industry's anticipation of renewed and increased business immediately following the war is supported by the knowledge that the industry has the raw material and the equipment and knowledge to make pulp products that the world will need.

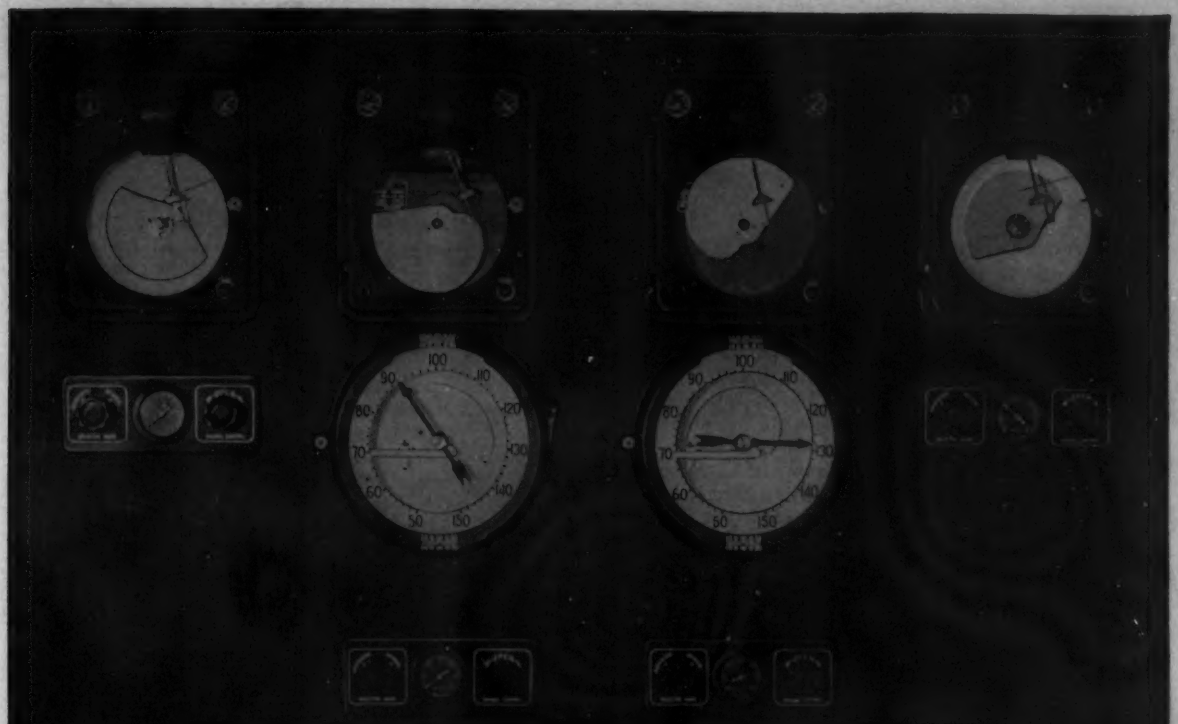
A "Depressed" Industry

Two of the major factors that have a restraining influence upon undue optimism regarding the outlook are, first the cumulative volume of deferred maintenance, caused by the fact that owing to war priorities neither material nor labor has been available for regular maintenance work; second, the fact that, up to the time of writing, none of the large pulp and paper companies yet know how much of their earnings the Government will permit them to retain, though all of them at the present time are on the best financial footing in their history.

The pulp and paper industry is still classed as "a depressed industry," due to the fact that prior to the war the majority of the individual companies were just emerging from bankruptcy and were engaged in a wholesale and fundamental reorganization of their finances. It was in recognition of this that the Government designated pulp and paper manufacture as a depressed industry for which there would be special modifications of the Excess War Profits Tax for purposes of assessing the total of corporation income taxes. What the modifications would mean has never been clearly defined, but for the past two years the accounting departments of the various companies have been engaged in numerous conferences with representatives of the Income Tax Department and have filled out lengthy questionnaire forms.

Recently there have been indications that the Government is quite as anxious as the companies have been to settle this matter, and one or two settlements on a small scale have indicated the form in which the matter will finally be disposed of. The indication is that each company will be dealt with on an individual basis. The Income Tax Department will decide upon an amount which will be set up as the standard profit for the concern and apply the excess war profits tax to whatever amount exceeds that standard profit.

In ordinary concerns pre-war profits are taken as the standard of profits approved, and earnings beyond that figure are regarded as war profits, to be paid as such to the Government, on the basis that there shall be no war profiteering. As the pulp and paper concerns at the outbreak of war could not be said to be making any profits, it would be manifestly unfair to tax all profits they may have made subsequently as "excess war profits" to be handed over to the public purse.



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There are other uncertainties in the outlook which have a definite restraining influence on optimism. Befor the extent of the hoped-for expansion in the industry in the post-war period can be estimated the companies await definite information on post-war credit arrangements for overseas importing companies; the direction and extent of pulp and paper exports from Scandinavian countries and Finland and Russia; the effect on prices of such competition; and finally whether post-war taxation in Canada will be on a basis to make capital investment worth while.

What About U. S. Exports?

As regards post-war exports to the United States, Canada's chief customer for newsprint, recent developments have added emphasis to the suggestion made by leaders in the industry that there should be international agreements by which markets would be assured abroad for Canadian newsprint. Specifically this suggestion has been made in public addresses by Charles Vining, president of the Newsprint Association of Canada and chairman of the Joint Executive Board of the Canadian Pulp and Paper Association and the Newsprint Association; also by Paul Kellogg, general manager of the last-named organization. Pointing out that immediately preceding and also following the outbreak of war such agreements, in which the United States and Great Britain were concerned, were made covering coffee, sugar, and the handling of oil and cotton, they say that pulp and paper are fully as important to Canada as the commodities mentioned to other countries, and it might be that without losing the vitality of free enterprise Canada could find in agreements of this kind a pattern to fit her legitimate interests in the marketing of pulp and paper to suit the interest of her customers in stability of supply.

Bombshell in Trade Circles

Subsequent developments which have given great emphasis to this suggestion reveal that an agreement of this kind may prove vital to post-war arrangements in respect to the maintenance of United States exports to Canada, the second best customer of the United States, and at the moment by far its best customer as well as one which has not taken a dollars worth of Lend-Lease goods. What is not yet generally known in the United States, and is hardly yet realized by the Canadian people, is that the recent visit to Ottawa of a commission under the leadership of Lord Keynes, British financial expert, has literally bombed the Canadian Government into a realization of the implications to the whole structure of Canada's foreign and domestic trade of the fact that Britain, formerly the world's greatest creditor nation, is now the world's greatest debtor.

The mission made it plain that Britain will not have sufficient dollars to buy Canadian goods after the war on anything like the scale she did before the war; that after the defeat of Germany but before the defeat of Japan Britain's imports from Canada must be regulated by the volume of Canada's imports from Britain; that Britain must maintain the greatest possible self-sufficiency in the production of agricultural commodities such as she formerly bought from Canada, even to the extent of denying herself of non-essential imports, such as Canadian fruit; and that if Canada were to offer to extend credits for the purchase of Canadian goods, Britain would refuse to accept them, as she was determined not to add to her already colossal public debt.

These representations were placed before the Canadian Government not as a loaded pistol for bargaining purposes but as a sobor statement of inescapable facts, the idea being, not "What are you going to do about it?" but "What are we going to do about it?"

New Import Division Established

One immediate result has been that the Canadian Government has decided to establish an Import Division in its Trade and Commerce Department, a departure which establishes a precedent among the major exporting nations and one which undoubtedly will have far-reaching results and have also an important bearing on the trade relations between Canada and the United States, seeing that for many years the greatest volume of Canada's exports have been to the United Kingdom and the greatest volume of Canada's imports have been from the United States.

For decades Canada has had a large annual credit balance on her trade with Britain and a large debit balance on her trade with the United States. In the last full year before the war Canada's credit balance on trade with the United Kingdom amounted to $265,000,000. In the same year her debit balance on trade with the United States was $60,000,000. In some years the debit balance has been $300,000,000, and in peacetime years Canada's purchases from the United States have reached as much as $600,000,000 in excess of her purchases from Britain.

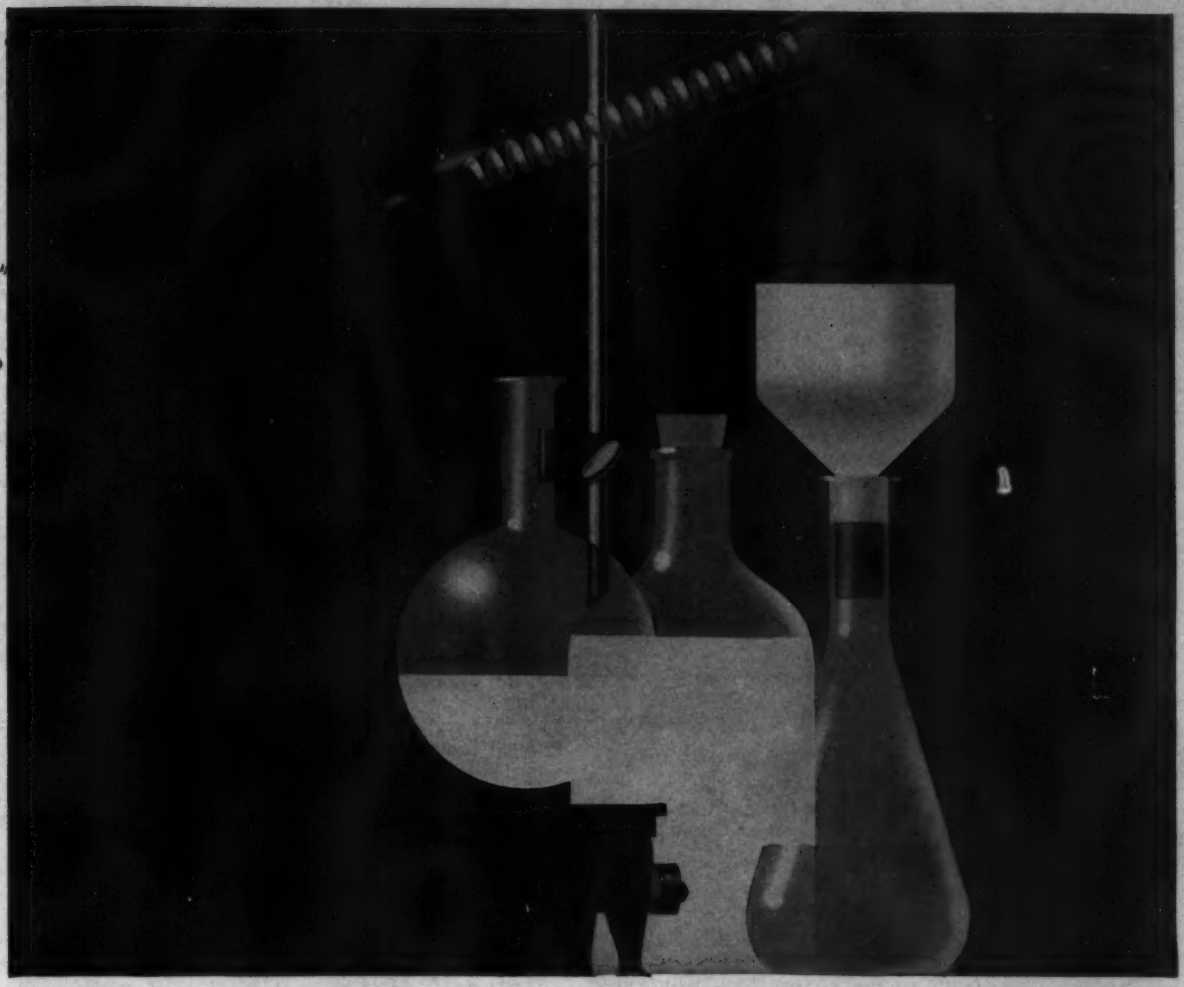
Instructions to Trade Commissioners

Instructions are now being given to Canada's Trade Commissioners all over the world that while their duties will still be primarily directed towards fostering Canada's export trade, they are at the same time to do all they can to foster imports into Canada from the countries in which they are stationed, and particularly from Britain and the countries in the sterling area. It does not need to be emphasized that there is no reason for such solicitude in respect to the importing of commodities from the United States, since these have been consistently much larger than Canada's exports to the United States.

Hitherto by far the greatest source of U. S. dollars for Canada, outside the export of gold, and certainly the most consistent source of all, has been the export of newsprint to the United States, and it may well prove that the United States will find it in their own interest, in order to preserve Canada as their best customer, to take measures to assure not only the fullest possible measure of imports of Canadian newsprint in order to help provide Canada with dollar funds for the purchase of American commodities but also to ensure the United States a stable and dependable source of newsprint supply.

How Britain Paid Canada

While on this subject it may be explained that an important pre-war factor in enabling Britain to pay the large debit balance on her trade with Canada was by means of the money she received from Canada as interest in her investments in this country. The major part of those investments, however, she no longer holds. She has used them to pay for war supplies from Canada. During the war Canada has repatriated from the United Kingdom $800,000,000 in Canadian securities, of which $700,000,000 were repatriated by the Canadian Government and the balance by sales on the Canadian market. Fortunately British capital-



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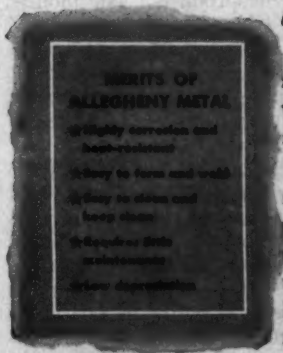

THERE are a lot of new faces along the street—high-octane gas, synthetic rubber, magnesium, dehydrated foods, war chemicals and explosives, just to name a few.

But Allegheny Metal kept pace—with new grades, new techniques to meet the requirements for processing these products. There was the need for high resistance to chemical attack, and to oxidation at heat—the need for great strength, long life, easy cleaning and freedom from contamination—requirements, all of them, that stainless steel answers best.

If—somewhere along the line in the manufacture of food and dairy products, drugs and chemicals, oil and plastics, textiles and paper—your plans would be profited by a steel with Allegheny Metal's special qualifications, let us help you develop them. Allegheny Ludlum Steel Corporation, Brackenridge, Pa.

Allegheny Metal is also handled and stocked by all Joseph T. Ryerson & Son, Inc. warehouses

W&D 9370-C

ALLEGHENY METAL

The Time-Tested Stainless Steel

REMEMBER THE NAME TODAY FOR THE NEEDS OF TOMORROW

ists still have some investments in Canadian enterprises. It has been roughly estimated that Britain might receive $50,000,000 for investments still held in Canada after the war.

Ever since Canada made her million dollar gift to Britain, to enable Britain to continue to purchase needed war supplies from this country, the authorities have been collaborating with British-owned Canadian industry towards making available more British purchasing power in this country. An instance of this was seen when the Dunlop Tire and Rubber Company, whose common shares are largely held in Britain, raised its dividends from 50c. to $1.25 per share, this being done, according to an official company statement, "at the instance of the Canadian exchange authorities." It is believed that proposed similar action has been discussed with many other companies in order to place more Canadian dollars at the credit of British account so as to reduce as far as possible the cost to the Canadian taxpayer of financing the deficit, and that considerable sums which might not otherwise have been available have been transferred or released.

So far, any discussion of these sensational developments which has appeared in the trade and financial journals has laid particular emphasis on the threat to trade between Canada and the United States, and the far-reaching upset in established practices in our industrial and domestic life, if Canada should be forced by circumstances to cease buying the many specialized and familiar products which we now import from the United States and replace them by products from Britain.

Vast Pulp Mill of Continental Capacity

Col. C. E. Reynolds, chairman of the Temiskaming and Northern Ontario Railway Commission, in outlining an ambitious program for the industrial development of Northern Ontario, has made the prediction that the future will see a vast pulp mill established at the mouth of the Moose River that will be capable of supplying the needs of all Northern America.

While his statement may be regarded by some with polite scepticism, it will serve to draw attention to what is probably the greatest and the finest stand of timber and pulpwood anywhere in eastern North America.

The Temiskaming and Northern Ontario Railway, it may be explained, is a railroad which was built many years ago by the Ontario Government as a colonization road. It originally extended from North Bay, on Lake Nipissing, in a line direct north to Cochrane. It was the building of this road which led to the spectacular discovery of silver in the Cobalt area and later to the uncovering of all the gold and other mineral riches of Northern Ontario and Northern Quebec. The railroad has since been extended to James Bay, the southern extremity of Hudson's Bay. The Moose River, which flows into James Bay at the point where the railroad has its terminus, has as its tributaries the Abitibi, Mattagami and Missinibi Rivers, each of which is over 300 miles in length and range in width from 300 to 400 yards to a mile. They flow mostly through virgin territory, an immense area of which is covered with merchantable timber.

A Romantic Story

I have travelled far and wide through this country up to the shores of James Bay, and not only was I impressed by the magnificent stand of timber throughout the region, but was astonished at the size of the trees encountered in some localities. They were by far the largest conifers I have seen anywhere east of the Pacific Coast.

The Indian guide with whom I travelled told me a romantic story in this respect. These huge trees were, he told me, the survivors from what, among the Indians, is called "The Great Fire" that swept this country practically bare more than a century ago, and which occurred under the following circumstances.

All this country is Algonquin country, and was, as it is now, the habitat and hunting ground of the Algonquin Indians. The Iroquois Indians, whose location was farther south, began an invasion of the Algonquin country and war resulted. The route of the invasion was via the Abitibi River, which, being north of the Height of Land, flows north to James Bay, and thus through the centre of the Algonquin territory.

For their invasion the Iroquois embarked on the river in a great fleet of war canoes, using as guide a captured Algonquin warrier. He was among the leading canoes at a point in the river where the current became swift and there he urged the whole fleet to paddle with the utmost vigor to prevent the current from carrying them on the rocks. They did so, and, suddenly rounding a bend, were swept over a waterfall and perished almost to a man. This waterfall, which ever since has been known as Iroquois Falls, is now the site of one of the sulphite and newsprint mills of the Abitibi Power and Paper Company.

The story, as related by the Indian guide, is that in revenge for this treachery of the Algonquin who served as guide, the Iroquois set fire to the forest and made "scorched earth" of this whole North Country. The dense stand of timber now there has grown up since that time, with spots that escaped the fire bearing the immense trees such as I saw in places, and whose long existence dates back into pre-historic times.

Ocean Shipping Is Available

This immense stand of timber in the Algonquin country has been classified as commercially unavailable, not only because of its distance from civilization, but also (and primarily) because all the rivers flowing through it empty into Hudson's Bay, and therefore cannot be utilized for bringing the timber to the mills or for shipping out the products. The pioneer in making use of these forest resources was the Abitibi Power and Paper Company which, when the T. and N. O. railway began to tap the southern fringe of the territory, established a mill at Iroquois Falls, and used the railway to ship out both raw pulpwood and finished products.

Now that the railway has been extended to the shores of James Bay, the rivers could be used to float pulpwood to a mill at that point and, for some months during the season of navigation, ocean tonnage might be available for shipping out the finished product via Hudson's Strait and the North Atlantic, or, for the matter of that, for shipping out raw pulpwood. These are the reasons why the prediction of Col. Reynolds may not be as far-fetched as on the surface it might appear.

New Mills and Expansions

A feature of the year just passed has been the renewed and widespread interest shown by large manufacturers of paper products in the U. S. in Canada as a convenient and dependable source for the supply of

. . THE PACKAGE GOT DELIVERED . . .

Ray Blank is employed by a Cleveland engraving company. He is a trustworthy messenger. How trustworthy you shall see.

Ray had been in the service of his country. At Casablanca and other places in North Africa, he had been in the military police. Put out of action by a truck, he had been honorably discharged.

On October 20, 1944, at 2:35 in the afternoon, Ray Blank was on a delivery trip. Just then, a tank of compressed liquid gas let go; sheeted flame blanketed the neighborhood, and quickly precipitated the worst disaster in Cleveland's history. Ray was caught. They tore his burning clothes off him and hustled him away for treatment.

Army trained, this modern "messenger to Garcia" held on to his package. That was his responsibility. It didn't belong to him. Consequently, a full and immediate report was due its owner. And the report had to go through. Period.

Arriving at the hospital, Ray asked that the whereabouts of himself and his package be telephoned to his company. Nothing happened. Ray insisted. He kept insisting until the doctor, impressed if amused, granted his patient's request. Next day, Ray's employers picked up the package and delivered it.

Ray Blank is still on the job. His head is still bandaged; some of the hair will never grow back. To many of us this is a badge of faithfulness which stands for duty well done.

Responsibility

Do we need to enlarge tediously on so simple a narrative? This country of ours is in a greater hurry than ever before in its history. Every day, every man and woman of us helps or hinders that speed with every movement we make. If any one of us lags for an instant in any department in any organization in any branch of industry, that lag carries through to front lines where our sons are dying for lack of the things they need.

THE LINDSAY WIRE WEAVING COMPANY

Serving the Paper Industry Since 1903

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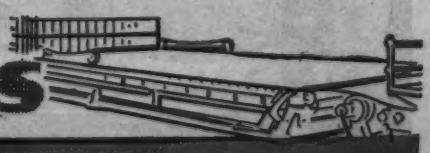


Lindsay **WIRES**

FOR PAPER MILLS

pulp. This has resulted in several large undertakings being initiated for the manufacture of pulp.

The most notable of these is an $8,500,000 project, now under way, and said to be the largest building project of the year in North America, for the construction of a 90,000 ton sulphite pulp mill in Canada by the Marathon Corporation, of Wisconsin. The mill is being built at Marathon, on the Ontario shore of Lake Superior. The project includes elaborate docking facilities and the construction of a model town. Another big American project is that of a subsidiary of the Kimberley-Clark Corporation, of Neenah, Wis., which is building a crepe wadding mill at Kapuskasing, Ont., the total cost of which, with its auxiliaries, will be in the neighborhood of $1,000,000. Then again the Kalamazoo Vegetable Parchment Company has purchased the Abitibi interest in the Espanola area of Ontario, and are carrying out preliminary construction work in connection with a $5,000,000 project which includes substantial additions to the former Abitibi mill at Espanola and installation of new sulphate machinery to bring production up to 225 tons of sulphate or kraft pulp daily, which will supply 70% of the raw material for the parent plant in Michigan.

In respect to expansions by Canadian companies, the largest projects are in British Columbia, where plans, now awaiting post-war release of materials and labor, include a $10,000,000 expansion program by the Powell River Company; proposals for a pulp mill in the Prince George area; and new installations for other pulp and paper mills on the B.C. coast and on the west side of Vancouver Island which will involve big outlays, but which, when completed, will enable the mills to meet stiffer competition, operate more efficiently and greatly diversify their products.

The Brompton Pulp and Paper Company, of East Angus, Que., is completing the big sulphite mill at Red Rock, Ont., construction of which was started before the war by the former Lake Sulphite Company.

Price Brothers and Co. are making additions to their mill at Kenogami, Que., to provide packing and shipping facilities and to improve the quality of the output of sulphate pulp.

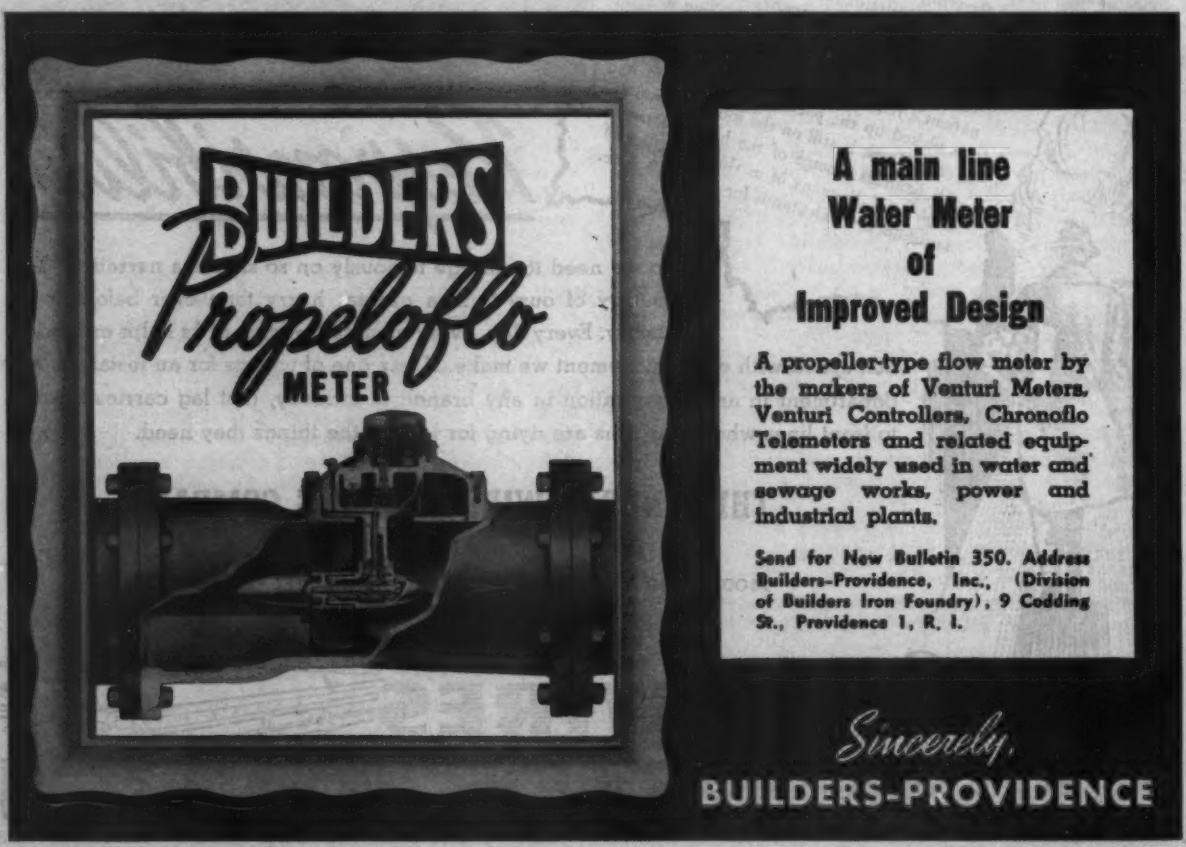
Building Products, Limited, of Montreal, are erecting at Ville Lasalle, near Montreal, a paper mill for the manufacture of roofing felt and sheathing paper, at a cost of around $365,000.

The Dryden Paper Company, Limited, of Dryden, Ont., is carrying out a plant improvement and modernization program involving an expenditure of around $550,000. Of this about $372,000 had been spent up to October 1st last, start of the company's current fiscal year. The new facilities will permit the company to increase production, lower costs and place the company in a better competitive position.

The Great Lakes Paper Company plans a capital expenditure of about $300,000 in its mill at Port Arthur, Ont. The first step will be to install some new equipment in the sulphite mill, including a felt dryer. This will not increase production, but will permit the mill to operate more efficiently. At present the company is shipping sulphite pulp 50% air dried, whereas the new equipment will bring the drying up to 90%. On this basis there will be considerable saving to the company in transportation costs alone. In addition the change will give a year-round continuity of shipments, as the 50% dried pulp is not acceptable to some shippers.

New Ventures in Byproducts

Intense interest is being shown throughout the in-

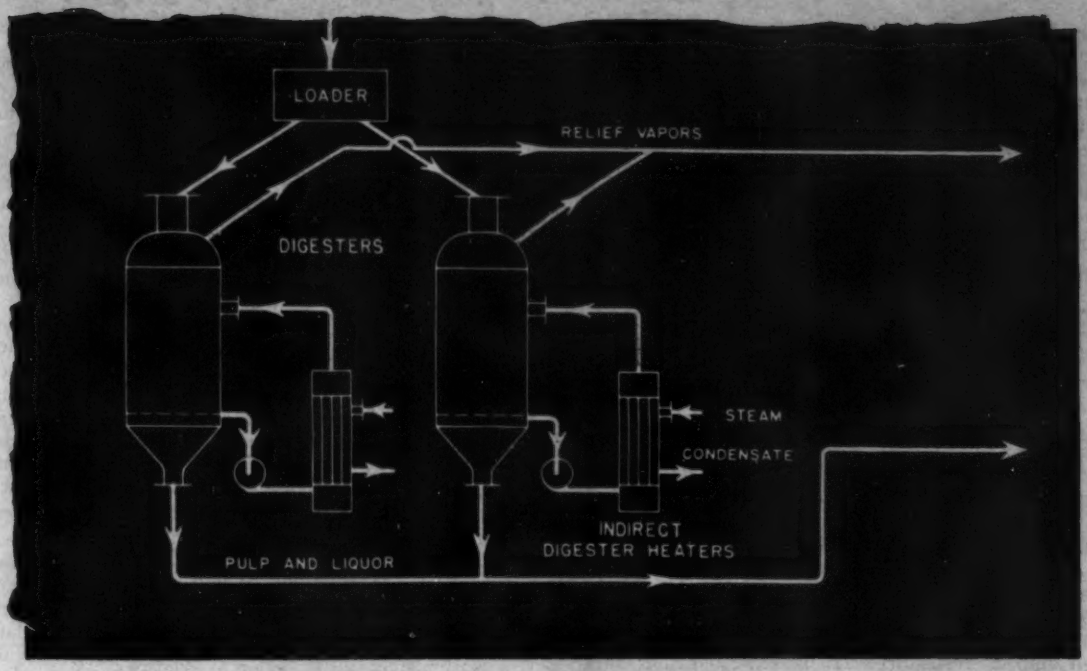


A main line Water Meter of Improved Design

A propeller-type flow meter by the makers of Venturi Meters, Venturi Controllers, Chronoflo Telemeters and related equipment widely used in water and sewage works, power and industrial plants.

Send for New Bulletin 350. Address Builders-Providence, Inc., (Division of Builders Iron Foundry), 9 Codding St., Providence 1, R. I.

Sincerely,
BUILDERS-PROVIDENCE



PULP COSTS REDUCED with INDIRECT DIGESTER HEATING

Direct digester heating requires approximately 4,000 lb. of steam for the cooking of every ton of pulp . . . and condensate is unfit for boiler feedwater.

With the Foster Wheeler system of indirect heating a heat saving of about 30% is effected and all condensate is recovered and returned to the boiler feedwater supply. Additional advantages of the system include:

1. **Less steam needed for concentration of black liquor.**
2. **Improved quality of pulp due to forced circulation of liquor.**
3. **No dilution of the cooking solution in the digester.**

Liquor circulates continuously between the digester and an external heater where it is indirectly heated by steam. Approximately 90% of the hot liquor is returned to the top of the digester, the remainder to the bottom. This serves to keep chips in the top continuously immersed, thus insuring thorough cooking.

FOSTER WHEELER CORPORATION, 165 BROADWAY, N. Y. 6, N. Y.

FOSTER WHEELER

dustry in the manufacture of byproducts, and particularly in the manufacture of plastics and the commercial utilization of waste sulphite liquor. In this latter connection close watch is being kept on the experiment of the Ontario Paper Company which, at the request of the Department of Munitions, established at its own expense at Thorold, Ont., a plant for the manufacture of ethyl alcohol from sulphite liquor. This is said to be the only plant of its kind on the continent. The chemists at the plant are said to have gone far beyond existing practices in Europe, where such plants exist, and the ethyl alcohol now being produced is reported to meet the most stringent military specifications. All the product is being used for military purposes and the results in ordinary commercial use have yet to be determined.

Another interesting development is the addition to the Howard Smith Paper Mills at Cornwall, Ont., of a plant for the utilization of waste pulp liquor in the manufacture of lignin plastics. This plant is now coming into operation. By a new process developed by the company's technicians it is now possible to extract lignin in a relatively pure form. As dry powder it can be melted and moulded into various shapes similar to many other types of plastic moulding materials. The lignin powder may also be impregnated into paper to form laminated sheets that have a very high impact resistance. It is expected that these sheets will prove of great usefulness for electric switchboards, table tops and other furniture.

Hydro-Electric Power Development

Hydro-electric power development is such an essential factor in the pulp and paper industry in Canada, and indeed constitutes the most important subsidiary enterprise of so many of the large pulp and paper concerns, that a review of the industry must needs take it into account.

The net increase of water-power installation in 1944 was 68,700 horse-power, the smallest annual increase since 1939. It consisted almost wholly from completion of the 68,000 horse-power Brilliant plant on the Kootenay River in British Columbia. Canada's total hydro-electric installation stood at 10,283,213 horse-power at the end of 1944. One-fifth of this total has been installed during the last five years, almost wholly for war purposes.

In addition to the new hydro-electric installations during the war, much of the power developed and in use prior to the war has been diverted from peacetime to wartime uses. About one-third of the country's water-power development has been used for war production, with one industry alone—the aluminum industry—using at peak production one-third of all the hydro-electric energy consumed in the Dominion.

This industry is concentrated in Quebec Province, and as war orders for aluminum have been drastically curtailed, prospects are for a large surplus of power centered in the Saguenay River district unless new uses for aluminum and adequate post-war export markets enable the industry to maintain operations at a high level or other large power-consuming industries are established in the area.

Of the 2,000,000 horse-power installed in the past four years, 1,762,000 is in Quebec. It is believed that after all peacetime demands are met something like a surplus of 1,000,000 horse-power will be on the market in Quebec for any outlet available, and of these outlets a ready one will be the use of electricity as "secondary power" for steam raising purposes, as was done before the war by the pulp and paper industry.

Rules on Allocation of Chemicals

Simplified procedure to obtain extension of authorization for use of allocated chemicals has been announced by the Chemicals Bureau, War Production Board.

A single letter may be written to the War Production Board, Chemicals Bureau, Allocations Officer, Washington 25, D. C., listing all allocated chemicals and allied products for which an extension of authorization for use is requested beyond the limit set by Order M-300, Paragraph (v) or by any other Chemicals-Bureau order.

In this letter, the applicant should list each material, the applicable M-300 schedule or other order, each use for which authorization has expired, the unused quantity previously authorized for that use, the original allocation period, the date the material was ordered from the supplier, the requested shipping date, the date of arrival, and the requested time extension. If a number of materials are to be used together this fact should be mentioned in the letter.

Shipping difficulties have in some cases caused allocated materials to arrive after the allocation period, WPB pointed out. West Coast manufacturers in particular have been handicapped by late shipment. Difficulties are complicated by the fact that late arrival of one allocated chemical may delay use of other allocated chemicals required for the same purpose. Under Order M-300, Paragraph (v), allocated materials that have not been used by the end of the month following the allocation period revert to inventory and cannot be used without further WPB authorization.

The announced simplified procedure permits a single letter to be filed requesting extension of time for use in the case of several different materials instead of having the applicant file forms and letters under each different governing M-300 schedule or other order.

This simplified procedure applies only when requesting extension of previous authorizations for use and may not be followed when filing any other kinds of applications relating to allocated chemicals and allied products.

Espanola Plant To Start Next Year

It is expected that the Espanola, Canada, plant of the Kalamazoo Vegetable Parchment Company, bought a couple of years ago, will go into pulp production during the summer of 1946. This was the report given by Ralph A. Hayward, president of the company, to stockholders at the annual meeting held recently at Kalamazoo, Mich.

Mr. Hayward said that the pulp situation has shown deterioration rather than improvement in recent months, and that there were no signs conditions would improve in the next two or three years. In view of that the word that the Canadian plant would be producing pulp in about a year and a half was a distinctly optimistic note. Work on buildings and foundations is being carried on now and machinery installation will be started in May, it is believed.

All directors were re-elected, and they in turn returned all officers to their posts for the next 12 months. Directors are Jacob Kindleberger, Ralph A. Hayward, Charles S. Campbell, Alfred Southon, A. B. Connable, Dr. L. H. S. DeWitt, Frank Mossteller, A. B. Read, C. Hubbard Kleinstuck, Charles J. Monroe, and Joseph B. Kindleberger.

MURRAY PAPER MILL and WOODROOM EQUIPMENT

BACKED BY THE EXPERIENCE OF OVER HALF A CENTURY

Reproduced here are some of the better known Murray Woodroom and Paper Mill equipment that for years has been serving the paper industry — each item being improved as operating conditions demand more and more production. If you want complete details on the equipment shown here — or other woodroom or paper mill equipment — please ask for it.

BARKING DRUMS

KNOT DRILLS

WINDERSHAFTS

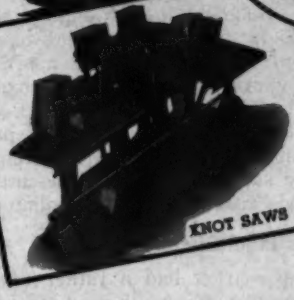
CHIP CRUSHERS

PULPWOOD SLASHERS

MULTIPLE KNIFE DISCS

FLAT SCREENS

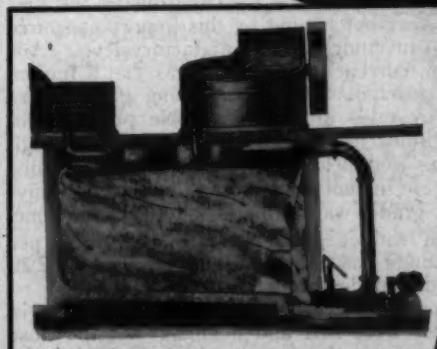
ROLL HEADING MACHINES



KNOT SAWS

WOOD CLEANERS
Other models available with Vertical Cutting Heads

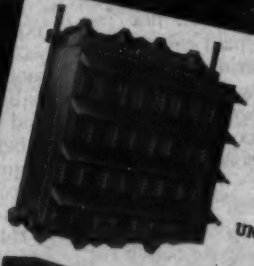
PULPWOOD CHIPPERS



Pulp stock agitator for thorough and complete agitation of pulp stock in chests.

GRID UNIT HEATERS AND BLAST SECTIONS

High test cast iron heating sections — one piece construction; no soldered, brazed, welded or expanded connections — made to last longer than the other types of heating equipment.



UNIT HEATER

"fin" sections made in one piece

BLAST SECTIONS

D. J. MURRAY MANUFACTURING CO. WAUSAU WISCONSIN

Heavy Demand for all Waste Papermaking Materials Marks Notable Year

Written Expressly for the Annual Review Number of the PAPER TRADE JOURNAL

Fibrous papermaking materials were in very heavy demand in 1944, which was a notable year. Much credit should be given to the waste materials trades for their cooperative efforts in maintaining the steady flow of fibrous materials to paper mills. As war requirements increased for wood pulp, not only for paper production but for nitrating, rayon manufacture, plastics, and other minor uses, fibrous materials, had to be depended upon. Total receipts for 1944 of waste fibrous materials are estimated at about 7,545,000 tons. As considerable quantity of paper mill broke has been included in the 1944 receipts, and does not so appear in previous years, figures of receipts and consumption of paper stock are not comparable with 1943.

Demand for Paper Stock Heavy

Mill demand for waste paper was very heavy throughout the past year. Paper stock was a major supply problem. Total receipts were estimated at 6,992,000 tons; consumption, 6,936,000 tons and inventories at 332,000 tons. The charted trend of receipts has been upward, with many periodical declines, since June, 1942. Since December, 1943, receipts have been only slightly above consumption. The trend in inventories shows a decline in late October, 1942, which continued until about the middle of November, 1943, to continue upward until October, 1944, with a slight decline apparent in December, 1944. With demand active and largely in excess of receipts, the market position of waste paper was very strong during 1944. Prices were firmly maintained at OPA ceiling levels. So keen was the competition of some board mills for paper stock, that the OPA reported several violations of its price ceilings. In one instance, a mill was reported to have paid more than twice the ceiling price for several carloads of waste paper. Despite these relatively few irregularities, OPA ceiling price levels have been very well maintained. The one major price change occurred on July 17, 1944, when the Office of Price Administration increased price ceilings on basic grades of paper stock $2 a ton, which included No. 1 mixed, folded news, old corrugated containers, and book stock. The average prices of the leading grades of waste paper for 1944, per one hundred pounds, based on OPA maximum price in sales to mills, were as follows: No. 1 mixed, .81¼; folded news, $1; heavy book stock, $1.92; No. 1 hard white shavings, $2.87½. These prices are the highest on record and reflect the extraordinary heavy demand and emphasizes the essential character of paper in the conduct of the war on the military and home fronts.

The War Production Board set a goal for collections of waste paper at 8,000,000 tons for the year. This was admittedly a high requirement. Collections have never approached this tonnage, although intensive campaigns to bring out more waste paper increased the 1944 supply about double that of pre-war years. More intensive drives appear essential for 1945 under greater difficulties, as the potential supply is steadily decreasing as more paper in many forms, is being shipped overseas and is uncollectable as waste paper to supply domestic mills.

Despite the excellent result of the several waste paper collection drives, receipts declined in November under October and December collections were under expectations. Inventories declined moderately and were 2% under the previous month of October but still 28% above the low point in January, 1944, which totaled 250,000 tons.

Cotton Cuttings in Active Demand

Mill demand for the papermaking grades of new cotton rags was active during 1944. Collections were maintained at a relatively high level, considering the steady decline in supplies available from the cutting-up-trade. As less and less white goods were available for civilian use, with military needs increasing, the supply situation in new whites became more and more limited. At the close of the year white shirt cuttings and unbleached cuttings were scarce and demand was substantially in excess of supplies.

Prices continued to be maintained strongly at ceiling levels by the steady volume required by paper mills. The average price of No. 1 whites was $3.80 per hundred pounds, which price prevailed unchanged in 1942 to date. The year closed with prices very strong at ceiling levels and a part of the urgent paper mill requirements unfilled. There appears no remedy to an increase in the supply of new cotton cuttings until more white goods are allocated for civilian use.

Old Whites Had Checkered Year

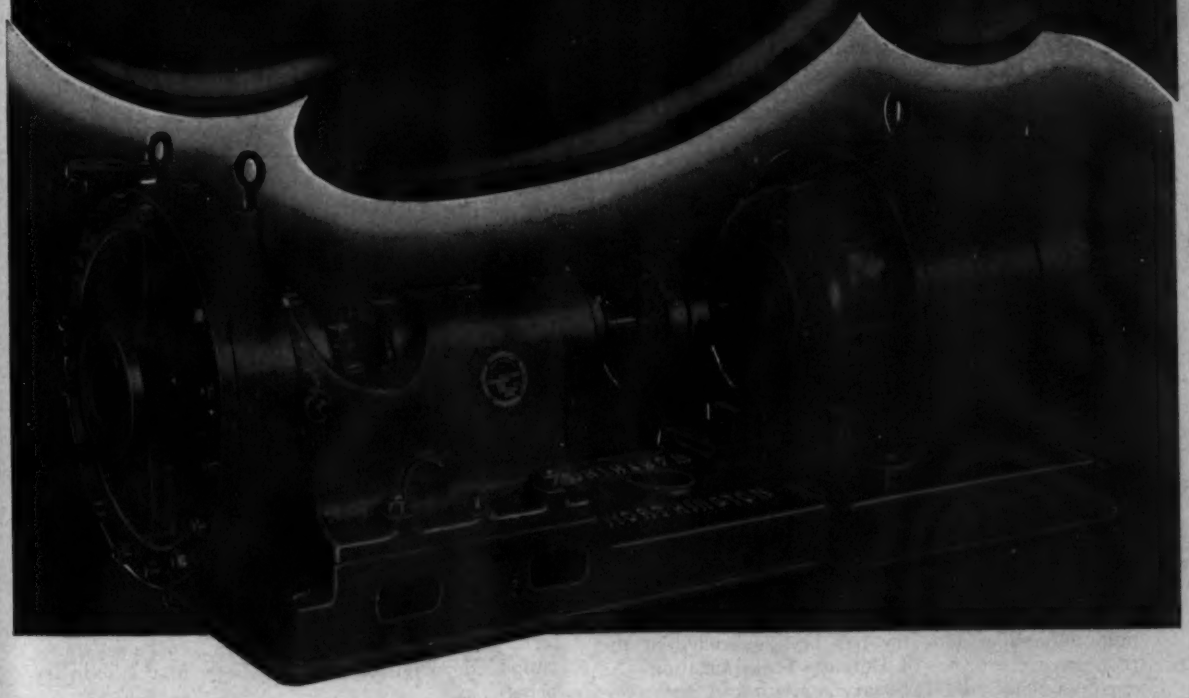
The old cotton rag market had a rather uneven year in 1944. The market was neither as strong or as active last year as in previous war years. Demand from roofing mills was active during the first half of the year but buying by this important source had built up inventories to a satisfactory level. Another reason, current in the trade, was that a limited tonnage of foreign rags in the roofing grades were purchased by mills at very favorable prices. Old whites continued as the most active grade through 1944. Prices were held firmly at ceiling levels. Third and blues were in demand now and then but mill buying in these grades was neither steady nor in volume.

Prices on satinet garments averaged $1.55 per hundred pounds and third and blues averaged $2.20 per hundred pounds throughout the year.

Mill demand for scrap bagging was very light in 1944. Prices were soft and nominal. At the close of the year some packers were asking $2.25 for No. 1 scrap burlap and 2.50 for No. 1 gunny.

Total receipts of rags, all grades, was estimated at 435,000 tons in 1944. For the first eleven months the increase in receipts was 7.5% above 1943, with some decline reported in December. Consumption aggregated an estimated 425,000 tons, or a little more than 3% above 1943. Inventories increased approximately 18% in 1944 over 1943.

BLACK LIQUOR CAME OUT OF THE RED



. . . when Worthington P.A.E's found a way to pump it with complete success . . .*

Black sulphite liquor—corrosive, abrasive, hot, foamy *and* with a tendency to solidify on cooling—is mighty troublesome to handle, but mighty profitable when handled right.

Black liquor is on the profit side of the ledger, in many mills today, with the help of the Worthington Type CH centrifugal pump—at present the only pump that handles it with complete success.

Valuable by-products for the coming age of "wood conversion" may be under consideration in your mill. When it comes to pumps—get in touch with a Worthington Pump Application Engineer.

"WORTHINGTON BUILDS 'EM ALL"

In addition to solving especially difficult pumping problems, a Worthington P. A. E. is best able to recommend the right pump for you—since Worthington makes *all* sizes and types of centrifugal pumps for *every* pulp and paper process.

Write or call our nearest District Office.

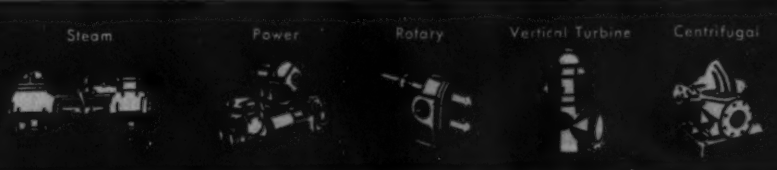
Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, N. J.

*Pump Application Engineer

BEHIND THE NAME WORTHINGTON

CP6-SP

THE WORLD'S LARGEST MANUFACTURER OF PUMPS



Paper Week Activities Greatly Restricted

Paper Associations Cancelled Conventions — Some Meetings Held But All Conform In Letter and Spirit To Request of Office of Defense Transportation — Various Associations Hold Elections.

The conventions of the leading paper associations, which for a long number of years in the past have featured Paper Week in New York, were conspicuous this year by their absence. No conventions were held by the American Paper and Pulp Association, The Technical Association of the Pulp and Paper Industry or the National Paper Trade Association. This was in response to the request of the War Mobilization Director through the Office of Defense Transportation that all organizations because of critical production, man power and transportation problems cancel any plans to hold meetings that would be attended by more than fifty persons especially if railroad or other long distance transportation would be required to reach the place of meeting. A number of meetings were held in New York during the week but in the case of all of them, it was endeavored to conform carefully to the letter and spirit of the request of the O.D.T.

President Brown's Report

D. K. Brown, president of the American Paper and Pulp Association presented the following report to the industry:

As you are aware the annual convention of the pulp and paper industry has been cancelled at the request of the Office of Defense Transportation. As a consequence, the February activities of the association are limited this year to essential committee meetings and the usual attendance has been very greatly curtailed.

In view of the many problems that have confronted the industry during the past year and in view of the fact that there will be no opportunity to report in person, it is perhaps in order to present by letter some of my reactions to the efforts made by the American Paper and Pulp Association and the supporting Divisional Associations in the industry's behalf.

D. K. Brown
President American Paper and Pulp Assn.

Washington-Press Photo Bureau
E. W. Tinker
Sec.-Treas. American Paper and Pulp Assn.

More and more it becomes apparent that if private enterprise and initiative is to survive, it must act with intelligence; and this means that it must be kept constantly informed regarding industry's broad economic and social problems.

As I review the work of the American Paper and Pulp Association during the past twelve months, taking into account the many ramifications and divisions within our industry, I feel justified in stating that while we cannot claim perfection, yet by and large the industry has expressed itself effectively and in most cases has taken intelligent action on problems affecting the industry as a whole.

Having had the privilege of attending meetings of various committees throughout the year, I have been greatly impressed with the conscientious service being rendered by committee members. The contribution of these committees to the welfare of our industry is probably not sufficiently well known nor fully appreciated.

No amount of money could employ the ability and knowledge that has been available to the industry as a result of this voluntary cooperative effort and I want to take this opportunity of expressing thanks for the encouragement and help received through the willing service on these committees of executives from large and small organizations alike. Thanks are also due to the various divisions and the secretaries thereof who have not only done a magnificent job in keeping their members advised of all developments, but have also given splendid cooperation to the parent association.

It is my firm conviction that after the war is won the need for good association team work is going to be greater than ever before and that the stronger we can

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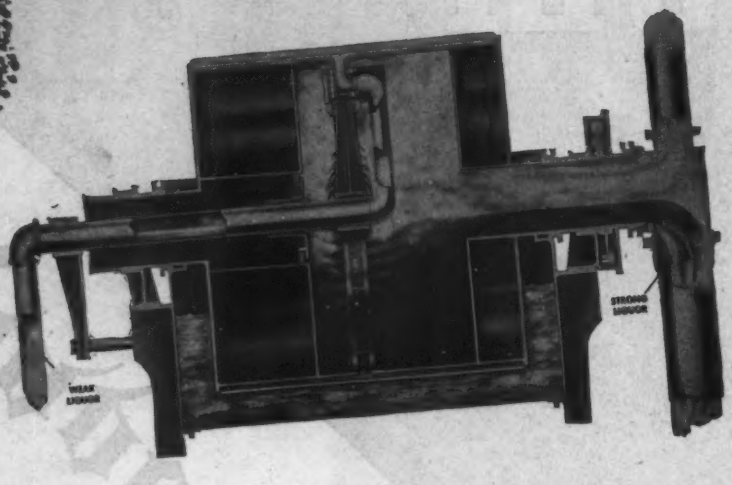
PAPER

OLIVER Ringvalve PULP FILTERS



Phantom drawing to illustrate principle of Ringvalve Design and Operation

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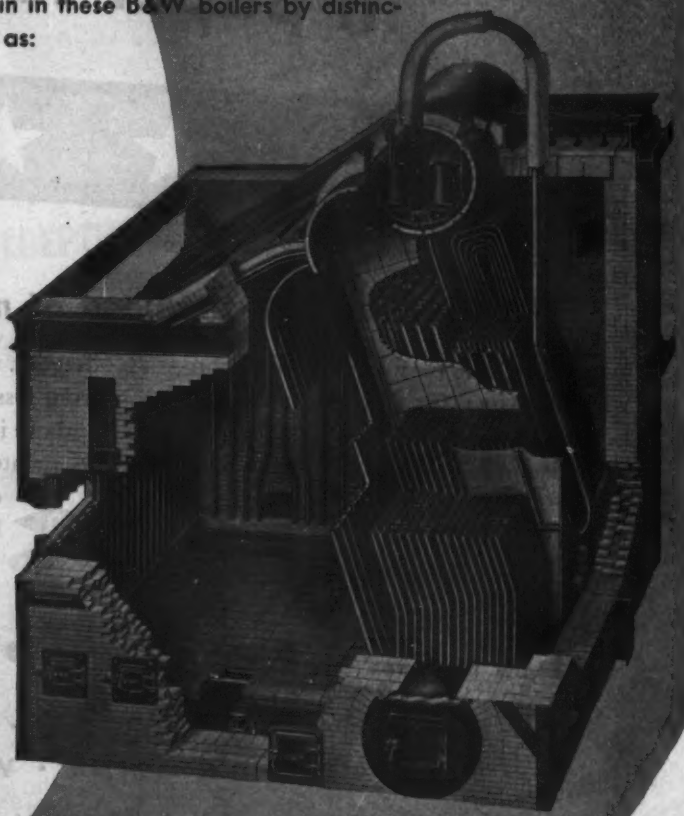

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PAPER AND BOARD

make our united effort the better will we be able to meet and solve the difficulties that will then confront us.

The problems will be many, not only those ordinarily pertinent to the operation of an industry, but also many of international importance, such as the tariff structure and international agreements affecting world trade. We can no longer live unto ourselves, and ways and means will have to be found to accept and absorb some portion of the world's goods in payment for our own export commodities.

We will need all the advice and counsel that our industry can give us if we are to protect our high wages and standard of living in competition with the products of countries with lower standards. This is a vital problem of labor and management alike. It is probable that Government controls over imports and exports will be continued for some time and these controls may be extended unless industry itself takes steps to organize for the tasks considered in the national interest, such as contributing to the balancing of our international account, full employment, etc. Despite this we must do everything possible to keep our industry in a position to enable it to negotiate on equal terms with foreign competitors.

Our industry can be proud of its contribution to the war effort, no small part of which is due to those members who have given and are giving so unselfishly of their time and effort to the various government agencies. To them we owe a great debt of gratitude as well as to those organizations that have so generously released key men for long periods of time.

Without their help and the splendid leadership in the Forest Products Bureau, which has inspired the utmost cooperation and efficiency in the Pulp and Paper Division, our problems would have been much more difficult during recent years.

By reason of the critical situation which has developed and still prevails in our industry, we have received tremendous free publicity from the press, magazines, and radio, which has created a public consciousness and appreciation of the value and importance of our products, both to the war effort and to peace-time economy.

We must find means to capitalize on this publicity in the future and thus continue to develop and maintain the position of our industry in the national life that it so well deserves. A start in this direction has been made by the employment of a public relations counsel on the association's staff; through him we hope to channel to the public all information of an overall industry nature.

As to the present outlook and immediate future of our industry, I can add nothing to what you already know. Suffice to say that it is going to tax our research, ingenuity, and practical application if we are to come close to meeting the demands immediately confronting us. However, I am confident that whatever emergencies may develop will be met in the same broadminded spirit that has existed to date in both integrated and converter mills alike.

In this connection, I want to pay my personal respects for the broad acceptance by the integrated mills of the policy which resulted in the diversion of pulp to the converter mills. This policy has had a far reaching effect in stabilizing employment in many localities where the community dependency on our industry is very high.

Reports have recently been published by certain agencies regarding the probable demands for our products in the years immediately following the end of the war, which statements might be construed by financial institutions and the investing public as warranting large expansion of our industry. It is not my intention to contradict these statements except to caution the industry against over-expansion without full investigation as to the assurance of a continuing wood supply therefor, as it is conceivable that legislation and other regulations on cutting of forest lands may result in setting a limit thereon at an amount which could be consumed by presently existing equipment.

Due to growth of population and the pent-up demand for our own civilian requirements as well as new uses for our products, it quite possibly justifies a reasonable extension of our facilities; but it would be a calamity if we were to over-expand to meet conditions which may not be of long duration.

In closing, I want to pay special tribute to the members of the executive committee and board of governors for their splendid support during the past year, as well as to our efficient executive secretary and his staff for their loyal support.

Secretary Tinker on Current Trends

Recent trends indicate that the relative stability that characterized pulp and paper production during most of 1944 may be short-lived and that serious economic disturbances may be in store for the paper industry and its customers in 1945, E. W. Tinker, executive secretary of The American Paper and Pulp Association stated. Unless steps can be taken to correct the factors that are threatening production, it is probable that the delicate supply and demand balance that has been maintained, largely by government control measures, will be seriously upset. The alternatives are clear. Either the production obstacles must be overcome or else new and more drastic paper consumption controls must be expected.

He pointed out that the current outlook is somewhat analogous to the situation that confronted the industry one year ago. The crux of the problem is now, as it was then, fibre supply. By a hard-driving coordinated attack, in which agencies, both public and private participated, the obstacles impeding paper production in 1944 were successfully overcome. Unfortunately, recent developments necessitate the marshalling of forces for a new and perhaps even more vigorous campaign in 1945.

The first and major obstacle to an adequate paper supply is pulpwood. Pulpwood production in December 1944 was 10.4% below production for the corresponding month of 1943. While statistical confirmation is not yet available the decline in pulpwood receipts since December has been marked and the situation is progressively deteriorating.

Specific Measures Proposed

If essential paper requirements are to be met this deterioration must be stopped and the present trend in pulpwood receipts reversed. It was stated as a guide to action in the current pulpwood emergency the American Paper and Pulp Association proposes the following specific measures:

(1) Congress and the Selective Service Bureau in the consideration of deferment policies should recognize the importance of farm labor to pulpwood production. Farm labor normally accounts for approximately 40% of the domestic pulpwood supply. Abrogation of the protection afforded farm labor by the Tyding's amendment or the tightening of Selective Service policies with respect to draft deferments for

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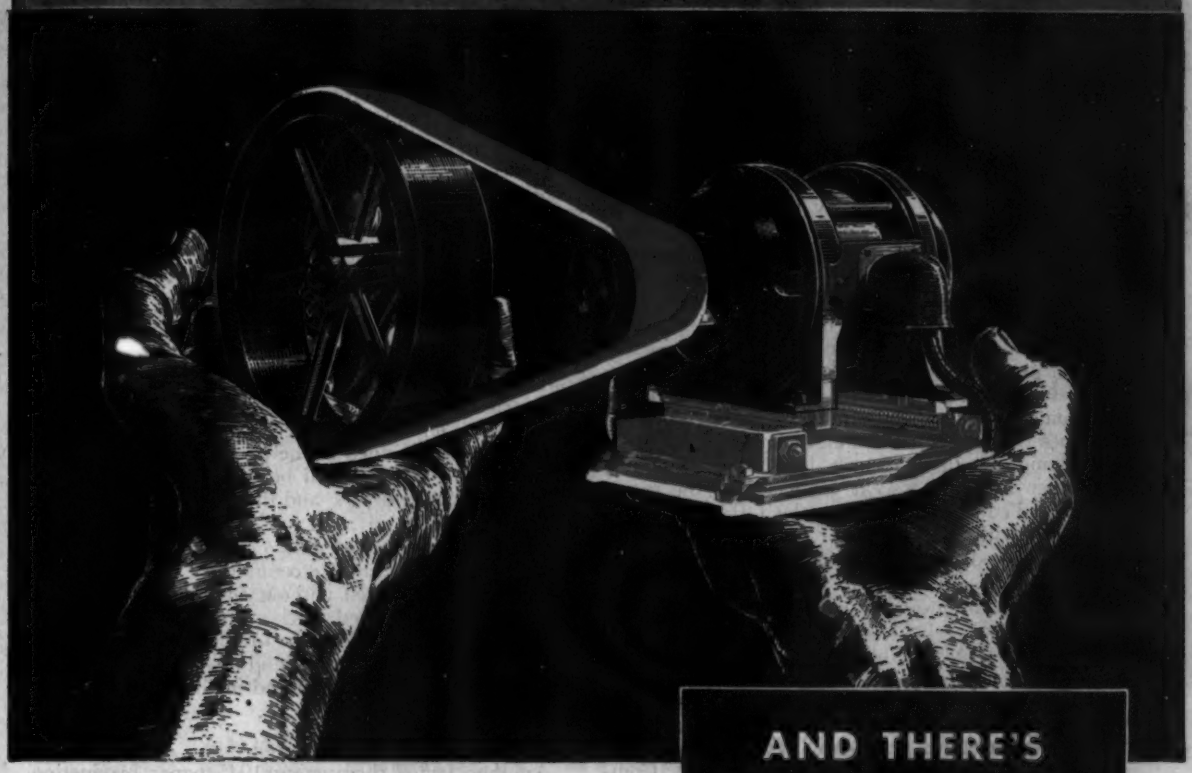

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farm labor in pulpwood areas could have very drastic effects on the future pulpwood supply.

(2) The War Manpower Commission should lend assistance to the industry in the matter of labor referrals. The War Production Board has sent a Field Service Bulletin to War Production Board Regional Directors, Production Urgency Committee Chairmen and District Managers requesting that they give every possible consideration in granting sufficiently high urgency ratings to insure adequate manpower referrals to producers of logs, lumber and pulpwood. More recently these activities have been declared "critical" by War Mobilization Director Byrnes. The War Manpower Commission should follow through.

(3) The War Department should make available, as rapidly as possible, as many prisoners-of-war as the industry can absorb. The industry, government agencies and the labor unions should support policies that will result in maximum utilization of prisoners-of-war in the woods.

(4) The War Production Board should continue its policy of making available necessary equipment for wood procurement purposes. The Office of Price Administration and the Office of Defense Transportation should liberalize their policies with respect to allotments of trucks, tires and freight car facilities.

(5) Congress should enact legislation extending the Timber Production War Project, and the informational and educational work of the T.P.W.P. should be pursued with renewed vigor.

(6) Pulpwood producers should abandon any unduly restrictive specifications that might interfere with maximum pulpwood procurement.

(7) Producers should adopt mechanized methods for pulpwood procurement to the maximum possible degree.

(8) Pulpwood producers should make ever effort to coordinate the activities of their individual contractors, rendering aid and advice wherever practical.

(9) Industry support of the War Activities Committee of the Pulpwood Consuming Industries should be continued.

Pulpwood a Major Problem

The problem of pulpwood supply can never be solved by over-optimism. If the industry is to fulfill its war obligations, its work program must be effectively coordinated in order that an adequate supply of pulpwood may be made available for pulp and paper production.

If the trend established in December 1944 persists, it is estimated that a total of 16,000 additional workers would be needed to meet the domestic goal of 16,000,000 cords of pulpwood in 1945 and at the same time restore inventories to the level of December 1942, it was stated. Estimates of regional requirements are presented below:

Region	Pulpwood Shortages	Additional Men Needed
Northeastern	1,051,000 cords	5,255
Appalachian	371,000 "	1,855
Southern	1,299,000 "	6,495
Lake	237,000 "	1,185
Pacific	252,000 "	1,260
Total	3,210,000 "	16,050

The second major obstacle to an adequate paper supply is waste paper. Waste paper inventories held by paper mills have been declining steadily since September 1944. Inventories of reporting mills on January 1st were 25.7% below the September level and the supply situation has been deteriorating steadily since December.

A year ago, when the outlook for waste paper supply was comparably dark, a carefully coordinated drive for salvage was undertaken. While the total receipts in 1944 were far short of the War Production Board goal of 8,000,000 tons, the results of the drive were nevertheless noteworthy. A total of 6,928,000 tons was collected, representing an increase of 12.5% over receipts for the preceding calendar year. In 1944 waste paper represented 37% of the industry's total available fibre tonnage, as contrasted with 35% in 1943.

Paper Stock Situation Serious

Shortages of pulpwood and wood pulp will certainly result in an increased demand for paper stock in 1945. An adequate paper supply will, in large measure, be contingent upon the satisfaction of this demand.

To aid in the satisfaction of this essential raw material demand, the following specific recommendations are offered by the Association:

(1) The industry should continue to support those industry committees that have been organized to further the cause of waste paper salvage.

(2) The salvage effort of the A.N.P.A., N.P.A., the commercial printers, and other paper consuming industries should be continued with increased vigor.

(3) The export of paper stock through F.E.A. should be discontinued in the present emergency.

(4) Fine papers should be separated from coarse papers in salvage drives, and the principle of "highest economic use" of salvaged stock should be adhered to.

(5) Industry representatives should actively cooperate with local salvage committees in the areas in which they are located without regard to their direct interest in the salvaged stock.

(6) The Salvage Division of the War Production Board should be maintained and should be adequately staffed both in Washington and in the field for effective paper salvage work.

Wood Pulp Inventories Decline

Another factor threatening 1945 paper production is the wood pulp situation. Wood pulp inventories have declined 17.1% in the course of the past year and pulp allocations for the first quarter are on the basis of a five-day average supply. With such a narrow margin of fiber supply, intermittent shutdowns are bound to occur with a consequent loss of paper production, it was said.

It is to be hoped that this situation will not be further aggravated by the ill-considered export of vital raw material supplies under an F.E.A. program at a time when our domestic paper production program is already in jeopardy.

By an all-out production effort and by the depletion of fiber inventories, paper production in 1944 was successfully maintained. In the light of recent trends and developments, however, it must be reported that the outlook for 1945 is currently far from good. It is clear that an aggressive well-coordinated effort will be necessary if the country's rapidly increasing pulp and paper demands are to be met, the statement concluded.

A.P.&P.A. Elects Officers

At a meeting of the executive committee and board of governors, on Wednesday, February 21, the following officers of the American Paper and Pulp Association were elected:

President: D. K. Brown, Neenah Paper Company; 1st vice-president: Cola G. Parker, Kimberly-Clark Corporation.

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Executive secretary-treasurer: E. W. Tinker, American Paper and Pulp Association, 122 East 42nd Street, New York.

Writing Paper Mfrs. Association

For the first time in the memory of those living, The Writing Paper Manufacturers Association did not hold its annual meeting during Paper Week.

Because of Mr. Byrnes' request to cancel all meetings having an attendance greater than 50, the 84th annual meeting of the Writing Paper Manufacturers Association was cancelled. In its stead, the Executive Committee met in New York City on February 19. At this meeting the mail votes on the nominations previously submitted to members of the Nominating Committee were tabulated and the following declared elected as officers and members of the Executive Committee for the ensuing year: President, H. H. Hanson; Vice President, M. D. Bardeen; Vice President, W. J. Garrity; Executive Secretary and Treasurer, M. C. Dobrow; Assistant Secretary, G. V. Johnson (in absentia).

Executive Committee: H. H. Hanson, W. C. Hamilton & Sons, Miquon, Pa.; H. R. Baldwin, Hammermill Paper Company, Erie, Pa.; M. D. Bardeen, Lee Paper Company, Vicksburg, Mich.; H. V. Burgee, Parsons Paper Company, Holyoke, Mass.; D. D. Coffin, C. H. Dexter & Sons, Inc., Windsor Locks, Conn.; W. J. Garrity, The Munising Paper Company, Chicago, Ill.; A. C. Gilbert, Gilbert Paper Company, Menasha, Wis.; Norman Harrower, Linton Brothers & Company, Fitchburg, Mass.; T. A. Hendry, The Mead Corporation, 230 Park Avenue, New York; Hale Holden, Jr., Byron Weston Company, Dalton, Mass.; W. W. Langtry, District of Columbia Paper Mills, Inc., Washington, D. C.; C. B. Morgan, Eastern Corporation, Bangor, Maine; E. A. Oberweiser, Fox River Paper Corporation, Appleton, Wis.; E. C. Reid, American Writing Paper Corporation, Holyoke, Mass.; A. C. Remley, Nekoosa-Edwards Paper Company, Port Edwards, Wis.; F. H. Savage, International Paper Company, 220 E. 42nd St., New York; W. B. Zimmerman, The Maxwell Paper Company, Franklin, Ohio; J. D. Zink, Strathmore Paper Company, West Springfield, Mass.; Alternates: R. S. Madden, Valley Paper Company, Holyoke, Mass.; A. P. Story, Chillicothe Paper Company, Chillicothe, Ohio.

At the meeting of the Cover Paper Group of the Writing Paper Manufacturers Association held on Wednesday, February 21, Mr. W. W. Langtry was reelected chairman of the Group, together with a governing committee consisting of the following: W. W. Langtry, chairman, District of Columbia Paper Mills, M. A. Park, Vice Chairman, The Marvellum Company, G. H. Beckett, The Beckett Paper Company, A. E. Frampton, Hammermill Paper Company, and R. H. Morrill, Chemical Paper Manufacturing Company.

At the meeting of the Bristol Board Group of the Writing Paper Manufacturers Association held on Monday, February 19, Norman Harrower was reelected Chairman of the Group, together with a governing committee consisting of the following: Norman Harrower, chairman, Linton Brothers & Company; Kendall Wyman, Vice Chairman, Champion Paper and Fibre Company; J. E. Holmes, Chemical Paper Manufacturing Company; R. M. Swaney, Franklin Paper Company, and H. W. Tunstall, Wheelwright Papers, Inc.

Forest Industries Council

Philip H. Glatfelter, president of the P. H. Glatfelter Company, Spring Grove, Pa., was elected general chairman of the Forest Industries Council, at a meeting of the Council held in New York February 17, 1945. He will replace F. K. Weyerhaeuser of the Weyerhaeuser Sales Company, St. Paul, Minn., whose term has expired. The office of chairman is held alternately by representatives of the Lumber Industry and the Pulp and Paper Industry. Mr. Glatfelter is the first representative from the pulp and paper industry to hold the office.

The Forest Industries Council was organized to afford an effective vehicle for the coordination of forest policy and program in the wood consuming industries. Five members from the Lumber Industry, three from the Pulp and Paper Industry and two from the Pulpwood Industry currently constitute its membership. The Secretaries of the National Lumber Manufacturers Association, the American Paper and Pulp Association and the American Pulpwood Association are ex-officio members. Pulp and paper representatives named to the Council for the new term are the following:

Members: P. H. Glatfeldter, P. H. Glatfelter Company, Spring Grove, Pa.; C. H. Sage, Kimberly-Clark Corporation, Neenah, Wis.; Sydney Ferguson, Mead Corporation, New York.

Alternates: S. B. Copeland, Northwest Paper Company, Cloquet, Minn.; Paul Koenig, P. H. Glatfelter Company, Spring Grove, Pa.; W. J. Damtoft, Champion Paper and Fibre Company, Canton, N. C.

Ex-officio: Earl W. Tinker, Secretary, American Paper and Pulp Association, 122 East 42nd street, New York 17, N. Y.

Working Committees of the Council include the Forest Industries Information Committee which promulgates information with respect to the forest products industries, the Committee on Timber Valuation and Taxation which was instrumental in securing important amendments in the 1944 Revenue Act, the Committee on Public Relations, and the Committee on General Forest Policy.

Progress reports were presented to the Council by these working committees at the February 17th meeting. A general Forest Policy Statement approved by the Council has been referred back to the trade associations of the forest industries for concurrence before publication.

Coated and Processed Paper Assn.

The following officers were elected at the annual meeting of the Coated and Processed Paper Association, held at the Hotel Commodore, New York, February 19: president, James T. Cronk, Hampden Glazed Paper and Card Company; vice-president, Manufacturing Division, William B. Snow, Middlesex Products Corporation; vice-president, Merchandising Division, Ralph H. Laue, Bradner Smith & Co.,

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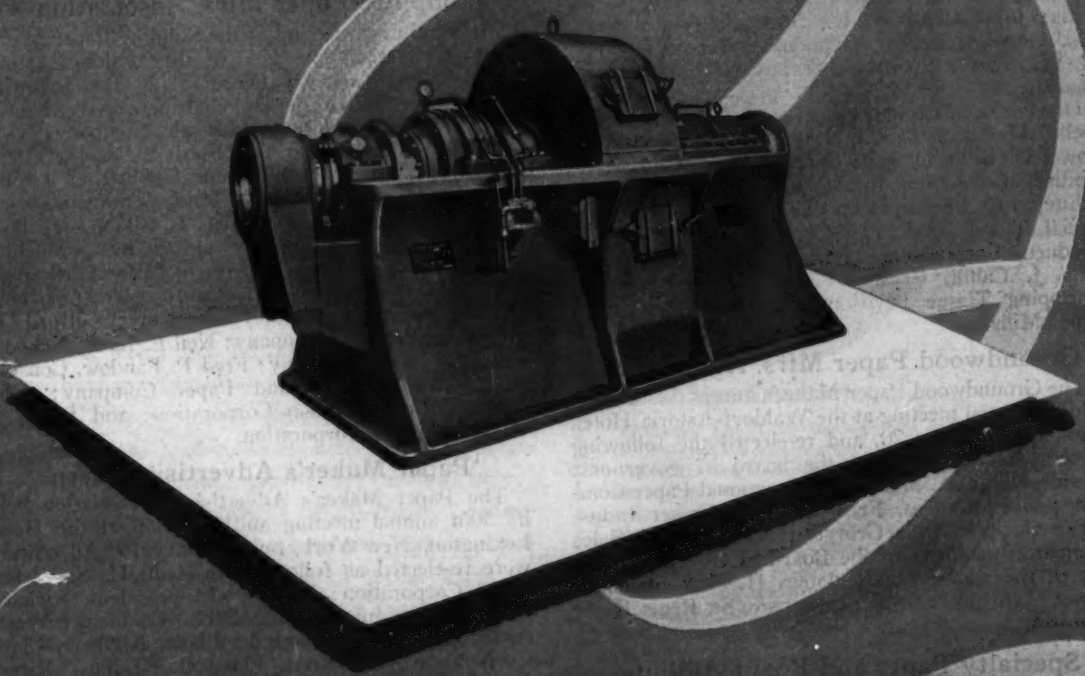

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Chicago; Charles Matthias, of Matthias Paper Corporation, New York, as a merchandising member of the Executive Committee for the term expiring in February, 1947; Sam R. Fry of Wyomissing Glazed Paper Company, Reading Pa., as a manufacturing member of the executive committee for term expiring in February, 1947. The other members of the executive committee are Harry B. Conklin of Louis Dejonge & Co., New York, as a manufacturing member, and George J. E. Buell of Charles W. Williams & Co., New York, as a merchandising member, the term of both expiring in February, 1946.

Arbitration Committee: Henry M. Donahue, chairman, McLaurin-Jones Company, Brookfield, Mass.; Robert C. Adams, the Marvellum Company, Holyoke, Mass.; M. V. Dunning, Jr., the K. E. Tozier Company, Boston, Mass.; Charles H. Hoffman, Hughes and Hoffman, New York; Fred C. Kaiser, Keller-Doran Corporation, New York, and treasurer, Arthur A. Thomas, who is executive director of the Association.

Tissue Association

The Tissue Association held its annual meeting at the Waldorf-Astoria Hotel, February 19, at which the following officers were elected: president, Joel F. Hartman, Barclay Tissue Corporation; vice-president, B. I. Reider, Victoria Paper Mills; treasurer, B. F. Picola, Gotham Tissue Corporation.

Board of directors: Wayne A. Brown, Crown Zellerbach Corporation; H. G. Wintgens, Hoberg Paper Mills; E. E. Grant, Crystal Tissue Company; A. B. Hansen, Northern Paper Mills; Grafton Houston, Fort Howard Paper Company; J. H. Leo, Brown Company; John McEwan, Mohawk Valley Paper Mills; John McKirdy, Jr., Scott Paper Company; R. B. Stevens, Stevens & Thompson Paper Company; R. W. Sweet, Sweet Bros. Paper Manufacturing Company.

Divisional Chairmen: Roll Toilet Tissue Division, Joel F. Hartman, Barclay Tissue Corporation; Paper Towel Division, O. E. O'Connor, Jr., Berst-Forster-Dixfield Company; Jumbo Roll Division, W. C. White, Jr., Pequannock Valley Paper Company; Facial Tissue Division, R. A. Marteith, Personal Products Corporation; Wrapping Tissue Division, John J. Cahill, Crystal Tissue Company; No. 2 Wrapping Tissue Division, James Suter, Rondout Paper Mills.

Groundwood Paper Mfrs. Association

The Groundwood Paper Manufacturers Association held its annual meeting at the Waldorf-Astoria Hotel, Tuesday, February 20, and re-elected the following officers and members of the board of governors: president, Paul A. Mahony, International Paper Company; vice-president, Fred W. Cole, Fraser Industries; vice-president, George H. Fay, Mead Sales Company; members of the Board of Governors consist of the above officers, James H. Coy, Flambeau Paper Company, and E. G. Murray, St. Regis Paper Company.

Specialty Paper and Board Affiliates

The Specialty Paper and Board Affiliates held its annual meeting at the Waldorf-Astoria Hotel on February 21 at which the following officers were elected: president, S. B. Sutphin, Beveridge Paper Company; vice president, W. B. Sheehan, Missisquoi Corporation. Executive Committee: S. B. Sutphin, Beveridge Paper Company, W. B. Sheehan, Missisquoi Corporation, H. S. Lewis, J. P. Lewis Company, P. R. Bachman, Riegel Paper Corporation, Kendall Wyman, Champion Paper and Fibre Company, T. Stewart Foster, Foster Paper Company, G. E. O'Connor, Mohawk Paper Mills, Frank C. Ash, Oswego Falls Corporation, W. S. Gamble, Brownville Board Company, H. C. Johnson, Sorg Paper Company, A. K. Nicholson, Hollingsworth & Vose Company, Jack B. Cowie, Hollingsworth & Whitney Company, Malcolm B. Lowe, Lowe Paper Company, Maurice A. Park, Marvellum Company, F. Henry Savage, International Paper Company, and J. N. Logan, Newton Paper Company.

U. S. Pulp Producers Association

At the annual meeting of the United States Pulp Producers Association, the following were elected by the executive board.

Regional Directors: New England, Amor Hollingsworth, Penobscot Chemical Fibre Company; Middle Atlantic, Norman W. Wilson, Hammermill Paper Company; South, Stuart E. Kay, International Paper Company; Lake States, Stuart B. Copeland, The Northwest Paper Company; West Coast, Robert B. Wolf, Pulp Division, Weyerhaeuser Timber Company.

Directors at Large: Alexander Calder, Union Bag and Paper Corporation; Downing P. Brown, Brown Company; J. M. Conway, Hoberg Paper Mills; U. M. Dickey, Soundview Pulp Company; Edward Bartsch, Rayonier Incorporated; and Lawson Turcotte, Puget Sound Pulp and Timber Company.

Executive Director: Oliver M. Porter, 122 East 42nd street, New York 17, N. Y.

Sulphite Paper Mfrs. Association

At the annual meeting of the Sulphite Paper Manufacturing Association, held at the Waldorf-Astoria Hotel, New York on February 20 the following officers were elected: general chairman, E. W. Kiefer, Port Huron Sulphite and Paper Company; vice-chairman Bleached Group, Fred W. Cole, Fraser Industries, Inc.; vice-chairman Unbleached Group, George Stuhr, International Paper Company; vice-chairman Manila Group, Rufus L. Sisson, Jr., Racquette River Paper Company; vice-chairman Machine Glazed Group, Wayne A. Brown, Crown Zellerbach Corporation, and Jack B. Coure, sales manager, Hollingsworth & Whitney Company; Gilford F. Henderson, Brown Company; Neil E. Nash, Nekoosa Edwards Paper Company; Fred P. Pandow, Consolidated Water Power and Paper Company; John Stevens, Jr., Marathon Corporation; and Rufus I. Worrell, Mead Corporation.

Paper Maker's Advertising Assn.

The Paper Maker's Advertising Association held its 30th annual meeting and luncheon at the Hotel Lexington, New York, on February 19. All officers were re-elected as follows: president, H. S. Foster, Mead Corporation; Eastern vice-president, Richard A. Faulkner, International Paper Company; Western vice-president, Frank L. Blake, Kimberly-Clark Corporation; treasurer, Floyd L. Triggs, Riegel Paper Corporation; secretary, Bradley E. Stafford, Strathmore Paper Company.

In the absence of Mr. Foster through illness, vice-president Faulkner presided at the meeting. Representatives of mills recently added to membership were introduced from the floor and included Charles Grant, Ecusta Paper Corporation, Joseph H. Dunton, W. C. Hamilton & Sons, and Frederick Rudge, Mohawk Paper Mills.

GOOD BEARINGS

ARE BASIC IN GOOD DESIGN

You won't get far in postwar competition without good bearings. And for any machine, a good bearing means simply that type which handles the load most efficiently and economically with the least maintenance cost and worry. That's where Rollway's Right-Angle Loading shines. It reduces load magnitudes and simplifies stresses. There's no piling of thrust loads on radial bearings or radial loads on thrust bearings. Shut-downs for bearing service and replacement are few and far between.

No Oblique Resultants . . .

Rollway's Right-Angle Loading splits compound loads into their two components of pure radial and pure thrust. Each component is carried at right angles to the roller axis on separate bearing assemblies. No oblique loads and resultants, no thermal float or uncalculated thrust can impose secondary pressures on any Rollway Bearing. That means a bearing of given dimension will last longer, or carry heavier loads, or run at higher shaft speeds, or give any proportional combination of all three. Send us your drawings for free analysis. Without cost or obligation, we'll tell you how to get more service from your bearing dollars.

ROLLWAY BEARING COMPANY, INC.
Syracuse 2, N. Y.

since 1908 makers of

ROLLWAY CYLINDRICAL ROLLER BEARINGS

SALES OFFICES: Philadelphia • Boston • Pittsburgh • Youngstown • Cleveland • Detroit • Chicago • St. Paul • Houston • Tulsa • Los Angeles

Vance P. Edwards Reelected TAPPI Head

Convention Is Cancelled By Technical Association of the Pulp and Paper Industry—Executive Committee Holds Meeting At Which Papers Are Presented By Title—Luncheon Is Held At Commodore.

The Technical Association of the Pulp and Paper Industry cancelled its annual convention originally scheduled for the week of February 19 to 22 inclusive, but the executive committee met in New York Sunday, February 18. At this meeting the papers scheduled for the convention were presented by title. On Monday, the executive committee gave a luncheon at the Hotel Commodore to which members in the New York area were invited. Following the luncheon James d'A. Clark presented the TAPPI medal to B. W. Scribner, chief of the Paper Section of the National Bureau of Standards, Washington, D. C., for outstanding service to the industry.

Election of Officers

Vance P. Edwardes, sulphite superintendent of the International Paper Company, Palmer, N. Y., was reelected president and Gunnar W. E. Nicholson, resident manager of the Union Bag and Paper Corporation, Savannah, Ga., was reelected vice president of the association.

William R. Barber, technical director of the Crown Zellerbach Corporation, Camas, Wash.; Worthen E. Brawn, general superintendent of the Pejepscot Paper Company, Brunswick, Me.; John A. Hanson, sulphite superintendent and chief chemist of the Badger Paper Mills, Inc., Peshtigo, Wis.; and James A. Wise, vice president in charge of manufacturing of the Kalamazoo Paper Company, Kalamazoo, Mich. have been elected to the executive committee to serve for three years.

The remaining members of the executive committee are as follows:—A. E. Bachmann, vice president and superintendent of the Missisquoi Corporation, Sheldon Springs, Vt.; W. F. Gillespie, technical director of the Gaylord Container Corporation, Bogalusa, La.; J. D. Malcolmson, technical director of the Robert Gair Company, Inc., New York, N. Y.; A. E. Montgomery, vice president of the J. O. Ross Engineering Corporation, Chicago, Ill.; F. W. Brainerd, research and development supervisor of the Scott Paper Company, Chester, Pa. and vice president of the Coos Bay Pulp Corporation, Anacortes, Wash. and Empire, Ore.; Pierre Drewsen, chemical engineer, Northampton, Mass.; K. P. Geohegan, chemist of the Aetna Paper Company, Dayton, Ohio and J. C. Nutter, mill manager of the Gair Company of Canada, Ltd., Toronto, Ont.

R. G. Macdonald
Secretary-Treasurer

Address of President Edwardes

The annual address of Vance P. Edwardes, president of the Technical Association of the Pulp and

Vance P. Edwardes
President

Gunnar W. E. Nicholson
Vice President

Rub-Roc Rolls may be identified by their distinctive red mottled surface. Note magnified section of RUB-ROC

Users confirm the advantages you get from MANHATTAN RUB-ROC ROLLS

"The paper shows absolutely no tendency to stick to this roll." The FLEXLASTICS* covering of RUB-ROC Rolls has a water repellent surface which releases the sheet instantly, leaving it smooth and free from pick-up.

"Doing an excellent job for us." This inclusive comment covers such advantages as: RUB-ROC will not crack; has uniform density; can be reground with the same equipment and ease as ordinary rubber rolls; delivers long service; makes a uniformly clean sheet.

"— big improvement over anything ever used previously." To the inherent advantages of FLEXLASTICS* are added the experienced-ripened arts of manufacture and the cumulative benefits of MANHATTAN'S 50 years of rubber manufacture. These bring you collateral advantages like longer felt life, reduced wear of doctor blade and convenient service from three plants strategically located for the paper industry — Passaic, N. J.; Neenah, Wis.; and North Charleston, S. C.

*The term FLEXLASTICS is an exclusive MANHATTAN trade mark. Only MANHATTAN can make FLEXLASTICS.

THE MANHATTAN RUBBER MANUFACTURING DIVISION
OF RAYBESTOS-MANHATTAN, INC.

Paper Industry, presented by title, was as follows:

It is my sincere regret that circumstances prevent me from talking to you personally. You have all received the notice of cancellation of our annual meeting which was scheduled to be held in New York on February 19-22, 1945.

I think I am justified in saying, and I believe you will concur, that it would have been one of the best meetings we had ever held. The policy of making members of the executive committee divisional chairmen, initiated last year, has accomplished a great deal in stimulating and encouraging committee activities. Several new and worthwhile committees have been organized and from the program published in the TAPPI Bulletin you can form your own conclusion of the success of this move. I am deeply appreciative of the effort the various committees have made to prepare the program as published.

As I have said before, the success of TAPPI depends so very largely on committee activities and the unselfish work of the chairmen and members that your executive committee is always searching for ways to encourage and maintain interest in their work.

As a move in that direction, divisional chairmen were planning to hold a luncheon meeting the first day of the convention with their committee chairmen, following which the various individual committees were to meet to discuss committee problems, policy, and outline the program for the coming year.

Naturally the cancellation of the annual meeting may result in a serious let-down of committee activity but it does provide a greater opportunity for sectional and divisional meetings in so far as they can comply with the requirements of O.D.T. During the past years for instance the Empire State Section has maintained active interest by conducting monthly dinner meetings of regional groups in widely separated localities and consideration of similar procedure is recommended to other sections covering large geographical areas. A very successful joint meeting of the Alkaline Pulping and Byproducts Committees was held in Savannah in October of last year. Similar divisional or committee meetings should be held in localities where the process covered by the particular committee is of prime importance, as for instance, mechanical pulping in New York and sulphite pulping in Wisconsin.

William R. Barber
TAPPI Executive Committeeman Elect

Although the papers prepared for the annual meeting will be published the local sections should avail themselves of this opportunity to secure these papers for presentation at their own meetings. Very interesting and worthwhile papers can be thus secured and publicly presented.

During the past year your president, vice-president and secretary have met informally, nearly every month. Many of these informal meetings have been attended by various executive committee members and in addition two formal meetings of the committee have been held. Your secretary has done his usual excellent job, even with the added burden of the Bulletin, which we believe is furnishing a needed service and may well become a permanent publication.

Your association has shown a healthy growth during the past year indicating a growing recognition of its value to the individual and the industry and it has given valuable assistance to the various procurement divisions of the armed forces.

For details of our war-time activities you are referred to the Secretary's report which should be a source of inspiration to all members.

What the coming year will hold for our industry cannot be foretold but the outlook with respect to our materials supply, both quantity and quality, as well as technical personnel is not encouraging. It will be our responsibility as technical men to do all within our power to anticipate and help solve the problems which will confront the industry we all serve.

Your officers and executive committee will continue to further the well-being of your Association to the best of their ability but after all the high opinion in which TAPPI is now held and its future welfare rests in your hands.

Worthen E. Brawn
TAPPI Executive Committeeman Elect

Report of the Secretary-Treasurer

R. G. Macdonald, secretary-treasurer of the association, presented his annual report as follows:

The Technical Association of the Pulp and Paper Industry in 1944 continued to devote its principal

ST. REGIS

SERVES ON EVERY FRONT

ST. REGIS V-MAIL PAPER is bearing millions of messages for our men on many fronts. These strong, clean, opaque sheets require less wood in their manufacture and thus are helping to relieve the pulpwood shortage. Other uses for St. Regis lightweight papers include domestic and overseas magazines, catalogs and directories.

Continuing research holds promise of ever-widening markets for St. Regis lightweight printing and specialty papers after the war.

ST. REGIS MULTIWALL PAPER BAGS are helping deliver flour, sugar, salt, chemicals, and building materials to our fighting men, our allies, and our own civilian population. Developed in close cooperation with Army, Navy, and Lend-Lease authorities, and custom-built to meet their specifications, St. Regis Multiwall bags are delivering the goods to every front.

This finest industrial peacetime package has demonstrated its right to be recognized as the essential wartime package.

PANELYTE — THE ST. REGIS PLASTIC is fulfilling an urgent need for a high-strength, lightweight aircraft flooring. This is one of the more than 2,000 molded and fabricated parts which the St. Regis Panelyte Division is turning out for the aviation industry alone. Panelyte is also saving minutes and money for the automotive, electronic, and refrigerator industries.

Straight-line mass production methods and engineering "know how" hold great promise for the future of this product.

SKENANDOA RAYON — the latest addition to the St. Regis family—is being used by our fighting men in parachutes, shroud lines, tow targets, and aircraft paulins. It is also used in wiring, cables, and for numerous medical supplies.

Vital in war, rayon will assume a leading place in the field of fashion, house furnishings, and transportation in the post-war era.

ST. REGIS PAPER COMPANY

Taggart Corporation • Skenandoa Rayon Corporation

New York 17: 230 Park Avenue — Baltimore 2: 2601 O'Sullivan Bldg. — Chicago 1: 230 No. Michigan Avenue • San Francisco 4: 1 Montgomery Street

efforts to assisting the industry and the wartime agencies of the Government.

MEMBERSHIP

The number of members in the armed services was increased considerably during the year. A record of these individuals was published once more in the TAPPI Year Book.

There were 242 individual members elected in 1944, 110 members resigned or were dropped. On December 31, 1944, the total individual membership was 2128.

There were 11 corporate and 15 sustaining members elected. There were no company resignations. The corporate membership on December 31, 1944 was 136, and the sustaining membership was 125.

The following companies became corporate members in 1944:

North American Pulp and Paper Company, Cheboygan, Mich,; Ohio Boxboard Company, Rittman, Ohio; The Marvellum Company, Holyoke, Mass.; H. P. Smith Paper Company, Chicago, Ill.; Hazen Paper Company, Holyoke, Mass.; Specialty Papers Inc., E. Braintree, Mass.; River Raisin Paper Company, Monroe, Mich.; Gummed Products Company, Troy, Ohio; Shellmar Products Company, Mt. Vernon, Ohio; Tested Papers of America, Inc., Chicago, Ill.; and Brittains, Ltd., Staffordshire, England.

The following companies became sustaining members in 1944:

Signode Steel Strapping Company, Chicago, Ill.; Southern Pulp and Paper Journal, Atlanta, Ga.; Wm. Cabble Ex. Wire Company, Brooklyn, N. Y.; Kidder Press Company, Inc., Dover, N. H.; J. E. Rhoads & Sons, Philadelphia, Pa.; General Printing Ink Company, New York, N. Y.; Warren Steam Pump Company, Warren, Mass.; Allis-Chalmers Manufacturing Company, Milwaukee, Wis.; Lombard Governor Corporation, Ashland, Mass.; Lobdell Company, Wilmington, Del.; Goslin - Birmingham Company, New York, N. Y.; Norton Company, Worcester, Mass.; Buffalo Electro-Chemical Company, Buffalo, N. Y.; Rust Engineering Company, Pittsburgh, Pa.; and the Railway Supply and Manufacturing Company, Cincinnati, Ohio.

JAMES A. WISE
TAPPI Executive Committeeman Elect

JOHN A. HANSON
TAPPI Executive Committeeman Elect

Corporate members that have joined the association since January 1 include: Standard Cap and Seal Company, Chicago, Ill.; Dianda & Cia., Ltda, Sao Paulo, Brazil; E. S. & A. Robinson, Canada Ltd., Toronto, Ont.; and the Brown Company, Berlin, N. H.

Sustaining members that have joined since January 1 include: The Bevis Machine Company, Middletown, Ohio; John Waldron Corporation, New Brunswick, N. J.; Magnus Chemical Company, Garwood, N. J.; Orr Felt and Blanket Company, Piqua, Ohio; Carthage Machine Company, Carthage, N. Y.; the Kalamazoo Tank and Silo Company, Kalamazoo, Mich.; and Link-Belt Company, Chicago, Ill.

NECROLOGY

The association lost through death the following members:

Ben Alexander, Masonite Corporation; Edgar H. Bristol, The Foxboro Company; Robert Caldwell, J. & J. Rogers Company; Charles H. Cashmore, Paterson Parchment Company; Alfred B. Clark, J. O. Ross Engineering Corporation; Frederick Grewin, Holmens Bruks & Fabriks; Henrick Grinstad, Brompton Pulp and Paper Company; James L. Jardine, James Brown & Co., Ltd.; M. M. Klosson, Buffalo Pumps, Inc.; Harold W. Knight, Bulkley, Dunton Pulp Company; Ogden Minton, Consulting Engineer; Harry D. Mitchell, Link-Belt Company; Murray M. Rubin, American Tissue Mills; Howard Lobdell Seaman, Lobdell Company, D. E. Scott, Chase Bag Company; Arthur F. Smith, General Electric Company; Herbert L. Thompson, Louis De Jonge Company; C. W. Heppenstall, the Heppenstall Company, and R. E. Demmon, Stauffer Chemical Company.

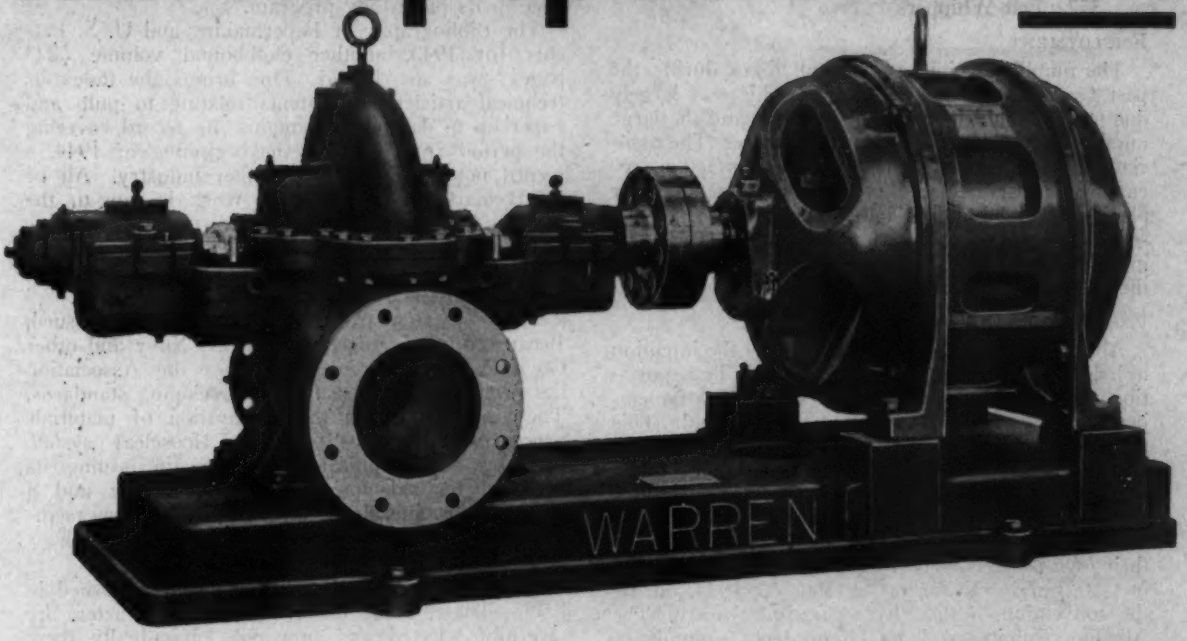
SPECIAL REPORTS ON MANUFACTURING PROBLEMS

For the past twenty-five years, the association has conducted a reporting service based on surveys, questionnaires, and investigations relating to pulp and paper mill problems. These reports are sent to individuals who supply information for their compilation and to the corporate members. In 1944 the following reports were issued:

No. 337 Enzyme Conversion of Corn Starch
338 Alignment of Cylinder Machine Press Rolls

PUMPS

that keep up with the mill



Warren Pumps have the ability to meet the increased demands of their jobs and this is being proven every day. For instance:

At the time of their installation at a well and favorably known eastern paper mill, each of seven Warren Pumps were called upon to handle eight hundred gallons of white water a minute. Then the capacity of the mill increased . . . so the operating speed of the pumps increased also to obtain a capacity of nine hundred gallons per minute. Later the tonnage of the mill increased and the same seven Warren Pumps are obtaining one thousand gallons a minute by simply operating at a still higher speed.

Performance with an available *plus* . . if that is the kind of performance you want, specify:

WARREN PUMPS

WARREN STEAM PUMP COMPANY, INC.

WARREN, MASSACHUSETTS

339 Effect of Calender Roll Diameter and Weight on Finish
340 Relative Merits of Engine Sizing and Tub Sizing
341 Printing Difficulty Caused by Groundwood Shives
342 Operation of Supercalenders
343 Disposal of Sulphite Waste Liquor
344 Stone Roll Breakage
345 Stuff Preparation in Beaters *vs* All-Jordan System
346 Calcium Carbonate in Coating
347 Use of White Water for Cylinder Machine Showers
348 Effect of Alum Treatment of Hard Water
349 Life of Sulphite Digester Linings
350 Brown Stock Washing in Sulphate Mills
351 Satin White in Coating
352 Felt Whippers

EMPLOYMENT

The number of jobs open at all times during the past year far exceed the demand. This was largely due to full employment by the industry and the large number of members in the armed services. The association, for many years, has conducted an active free employment service and has been the medium for placing several hundred individuals on jobs. When seeking employees such as managers, chemists, superintendents, engineers, etc., companies should notify the Technical Association Secretary.

FALL CONVENTION

Although it was not publicized, it was the intention to hold the fall meeting again in Chicago. Transportation and hotel difficulties caused a number of members to recommend that no meeting be held. This proposal was submitted to the membership for vote and with nearly the unanimous consent of the members voting, this prospective meeting was cancelled.

A number of the association's committees took advantage of this situation and held meetings to discuss their own projects. The Pulp Purification Committee met at Buffalo, N. Y., on October 13, 1944, during the convention of the Electrochemical Society. The Alkaline Pulping and the Byproducts Committees met jointly at the De Soto Hotel, Savannah, Ga., on October 18-20, 1944. More than 100 attended and discussed a number of technical papers and subjects. The success of this meeting was largely due to the efforts of G. W. E. Nicholson, K. G. Chesley, R. H. Stevens, and Kirk Sutlive. A feature of the meeting was a visit to the mill of the Union Bag and Paper Corporation in Savannah.

Other committees to hold meetings since the annual meeting included the Coating, Heat and Power, Materials of Construction, Nonfibrous Materials Testing, Water Vapor Permeability Testing, and Acid Pulping committees.

RESEARCH PROMOTION

Because of wartime difficulties no research projects were directly financed by the association during the year. Committee chairmen were recently advised to consider committee projects and to apply for financial assistance, if necessary, to carry on their work.

PUBLICATIONS

The publication activities of the association are rather extensive and cannot be given much space in this report. They are reported in detail in the 1945 TAPPI Year Book (394 pages) in which is cumulatively recorded all the publications that have been issued by the association.

Technical Association Papers (836 pages) was issued late in the year. Although it was ready for publication in June, printing plant and bindery manpower and other problems caused a delay of several months in preparing it for distribution. This volume contains the papers presented at the 1943 fall meeting, the 1944 annual meeting, and the stenographic transcript of the discussion. It is one of the largest single volumes of technical information issued by any professional society. It is bound in cloth.

The PAPER TRADE JOURNAL has continued to be a medium for the publication of many of the association papers. A section in each issue is devoted to such papers. The association is indebted to George S. Macdonald, president of the Lockwood Trade Journal Company, and Henry J. Berger, editor of the PAPER TRADE JOURNAL, for considerable assistance in its publishing program.

The Bibliography of Papermaking and U. S. Patents for 1943, another clothbound volume (223 pages) was also issued. This brings the index of technical articles and patents relating to pulp and paper up to date and maintains the record covering the period from 1900 to the beginning of 1944, a record not reached by any other industry. All of this remarkable bibliographic work is due to the untiring efforts of Clarence J. West of the Institute of Paper Chemistry. Plans are under way to issue a collective bibliography in 1946 to cover the ten year period 1936-1945.

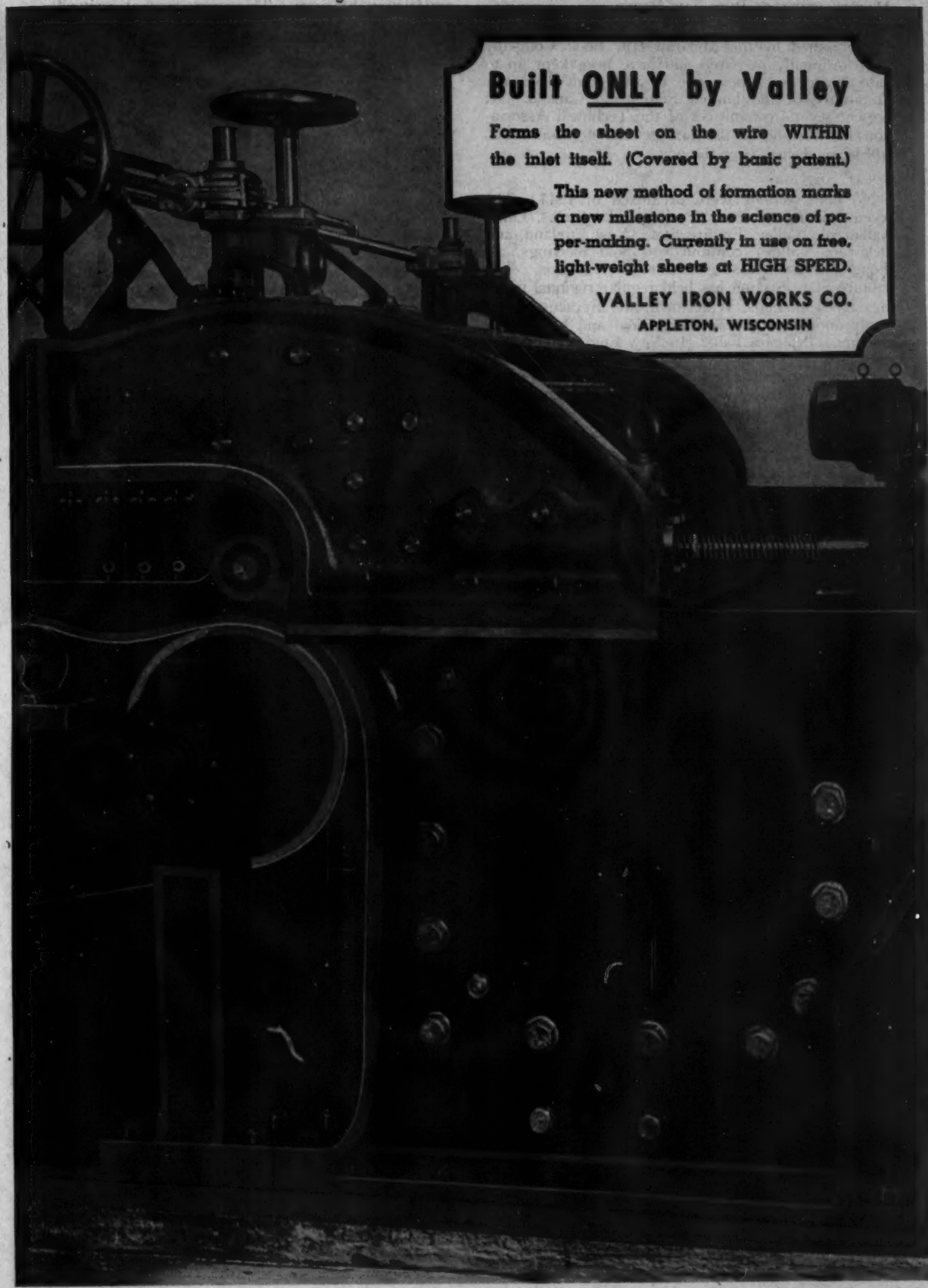
Sixty-one standard testing methods were issued. Because of the needs of the Army, Navy and other Government procurement agencies the Association has been particularly active in developing standards. These are needed in the preparation of materials procurement specifications. The looseleaf system used by the Technical Association in issuing its standard methods provides a convenience and a means of keeping always up to date since new methods may be added at any time and obsolete methods discarded.

Thirty-six engineering data sheets were issued in 1944. These, while miscellaneous in character, are carefully selected and prepared. Eventually these sheets will probably be incorporated in an industry handbook of considerable value. An attempt is made to avoid the material usually found in engineering handbooks.

The TAPPI Bulletin continued to be issued on a semimonthly basis in 1944. This four-page periodical is prepared to keep the average member abreast of technical developments related to the industry. During the war period it features material of immediate importance to companies acting as Government contractors. It is the most convenient source of information concerning the Government paper and packaging specifications. Each Bulletin contains a feature item that reports in semipopular style the most recent technical developments. Its restricted size obviates the use of research data but it serves as a guide to such material. It does not attempt to cover articles readily accessible to most of the members.

MONOGRAPHS

No new monographs were issued during the year. Two have been issued, one dealing with Industrial Water for Pulp, Paper and Paperboard Manufacture and the other with Saving Fourdrinier Wires. Other monographs are in preparation, most notably one dealing with the details of paper coating.


Built ONLY by Valley
Forms the sheet on the wire WITHIN the inlet itself. (Covered by basic patent.)
This new method of formation marks a new milestone in the science of paper-making. Currently in use on free, light-weight sheets at HIGH SPEED.
VALLEY IRON WORKS CO.
APPLETON, WISCONSIN

Manufacture of Pulp and Paper

The textbook on the Manufacture of Pulp and Paper issued by the McGraw-Hill Book Company were originally prepared and have been kept up to date under the supervision of the Joint Textbook Committee of the United States and Canada. At present several committees of the Technical Association are working on the next general revision which will be published after the war.

Local Sections

No new sections were organized in 1944. The seven existing sections (Pacific, Lake States, Ohio, Kalamazoo Valley, Empire State, New England, and Delaware Valley) continued to hold meetings, although, in some cases, on a restricted basis. The Empire State Section has held regular regional meetings at Glens Falls, Watertown, and Syracuse. Recently another group was organized and has held a meeting at Niagara Falls. In New England meetings were held at Pittsfield, Holyoke, Springfield, Fitchburg, and Boston, to permit members to attend without having to travel long distances. On the Pacific Coast there has been a similar arrangement. The Maine-New Hampshire Group has held meetings and should be eligible for section status in the near future. The Chicago Professional Paper Group had a successful year and although not a TAPPI Section at present, may eventually qualify.

Wartime Activities

Like other technical societies, the Technical Association has been frequently called upon to assist the various agencies of the Army, Navy, and other branches of the Government. Much of this assistance has been of a confidential nature and cannot be publicized.

In the TAPPI Bulletin, already mentioned, the Association has kept the industry up to date regarding currently issued procurement specifications.

The association has assisted the War Prisoners' Aid (Y.M.C.A.) in obtaining copies of papermaking texts, especially old issues of the Manufacture of Pulp and Paper for use of American prisoners in German internment camps.

On November 3, representatives of TAPPI and the ASTM met with representatives of the Army, Navy, War Production Board, and other Government agencies to decide what testing methods do not exist and are most urgently needed in connection with the preparation of specifications and to decide how they should be brought into being. A special task committee of the Technical Association was organized to proceed with this work and individuals were assigned to work on each of the methods most urgently needed. This work has been proceeding under the general direction of Major James d'A. Clark, Chicago Quartermaster Depot, Chairman of the TAPPI Testing Division; W. H. Graebner, Marathon Corporation, Chairman of the Packaging Materials Testing Committee; Don L. Quinn, Chairman of the Container Testing Committee, and B. W. Scribner, National Bureau of Standards, Chairman of the Paper Testing Committee. These committees are working closely and satisfactorily with the Army Packaging Board, the Navy, and the Container Coordinating Committee of the War Production Board.

A special task committee, under the chairmanship of Peter J. Massey of the H. P. Smith Paper Company cooperated with a committee of the Society of Automotive Engineers in developing paper specifications and tests for special wrapping papers for antifriction bearings. This work was of particular value to the Office of the Chief of Ordnance and the Army Air Forces.

During the year the association has responded to requests from such organizations as the Chicago Quartermaster Depot, San Diego Naval Air Station, Minneapolis Area AAF, Office of the Chief of Engineers, Production and Engineering Section AAF, Curtiss-Wright Corporation Propeller Division AAF, Wichita, Kansas Midwestern Procurement Districts, Jeffersonville (Ind.) Quartermaster Depot, Edgwood Arsenal CWS, Quartermaster Climatic Research Laboratory (Lawrence, Mass.), Technical Service Command AAF (Wright Feld), Philadelphia Signal Corps Depot, Specifications Section Signals Production Branch, Dept. of Munitions and Supply (Ottawa, Canada), Technical Investigations Branch, British Air Commission, Naval Clothing Depot (Brooklyn, N. Y.), Jersey City Quartermaster Depot, Containers Division, Bureau of Supplies and Accounts, Navy Dept., Naval Aircraft Factory (Philadelphia, Pa.), Rubber Reserve Corporation, War Food Administration, and others.

Institute of Paper Chemistry

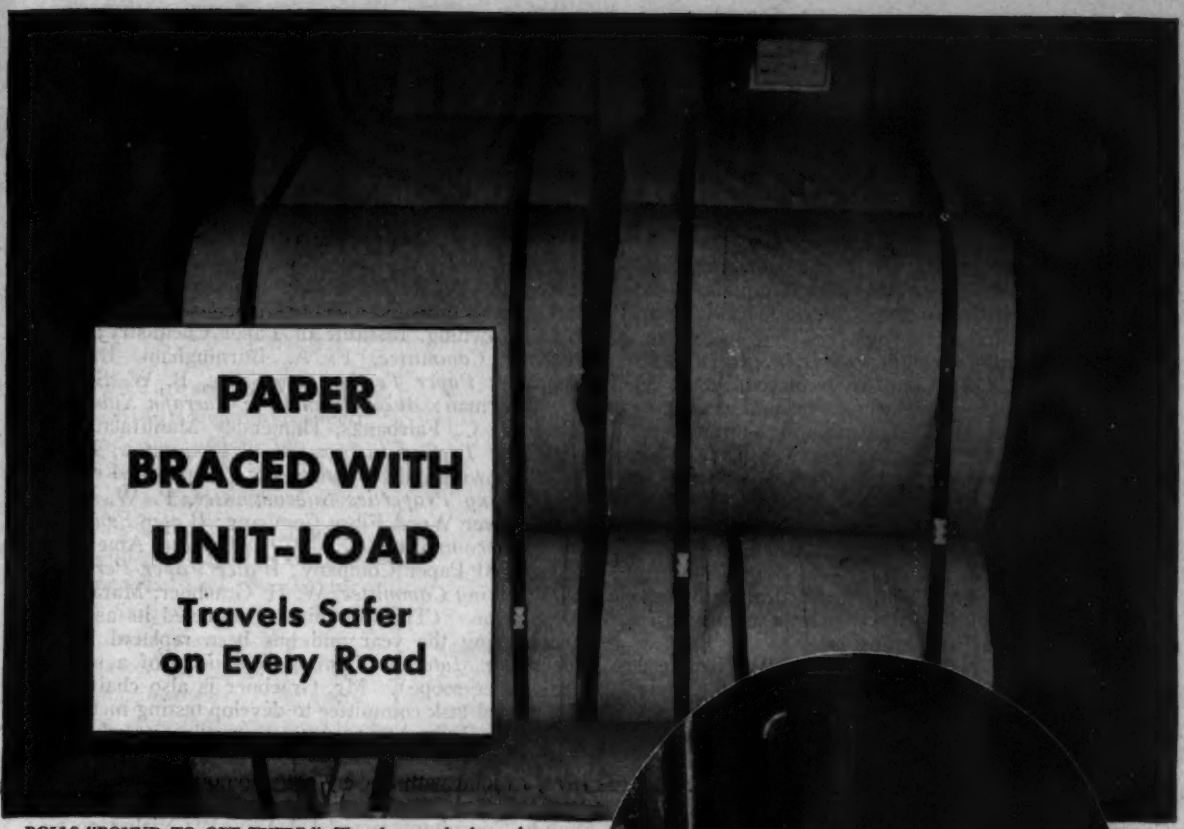
Excellent cooperation has marked the relationship between the Association and the Institute of Paper Chemistry. Several members of the Institute Staff are taking a leading part in Association committee work and are serving on task committees cooperating with the war agencies. The Association has contributed financially to the Institute.

Divisions and Committees

Even under the difficulties encountered in the everyday activities of members, manpower shortages, etc., the committees of the Association have, for the most part, carried on fine work. With the optimism that existed in the past fall relative to the war's progress, many committees felt that they were ready with constructive programs for the future. Some of these were planned for presentation at the 1945 annual meeting and it is to be regretted that the turn in events brought about a cancellation of the annual meeting at the request of the Director of War Mobilization. This was to reduce the heavy pressure on railroad and hotel facilities and to utilize technical manpower on the job, to the limit. Although the holding of the annual meeting would have created a great impetus to the committee and association work, compliance with the Government's request was of imminent importance and the spade work of the committees in organizing such a fine program has established the groundwork for more rapid advances as soon as it becomes feasible to proceed.

Personnel changes in the divisions and committees follow:

Engineering Division: W. G. MacNaughton, Newsprint Service Bureau, General Chairman. There were no personnel changes during the year. The present chairmen are: *Heat and Power Committee,* Roderick O'Donoghue, Consulting Engineer; *Drying, Heating, and Ventilating Subcommittee,* A. E. Montgomery, J. O. Ross Engineering Corporation; *Production and Transmission of Power Subcommittee,* E. F. Burns, International Paper Company; *Heat Utilization in Chemical Processes Subcommittee,* W. T. Webster, Brunswick Pulp and Paper Company. The name of the *Materials of Construction Committee* was changed to *Mill Maintenance and Construction Materials Committee,* James A. Lee, Chemical and Metallurgical; Engineering; *Packing Materials Subcommittee,* J. W.

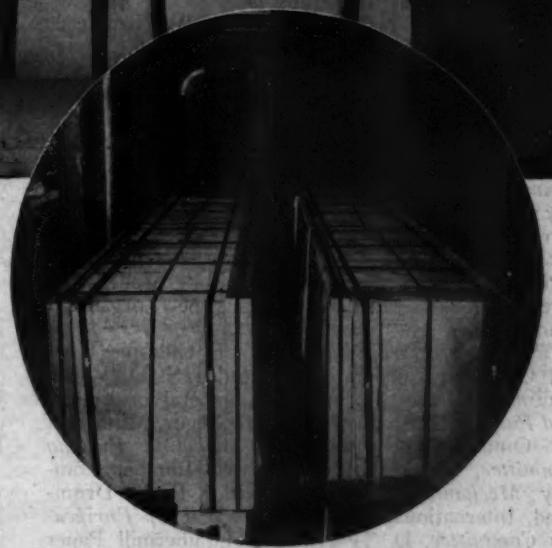


ROLLS "BOUND TO GET THERE." The photograph above shows how Acme Unit-Load is applied to a carload shipment of fine paper. The method illustrated above is the "Floating Load." Other Acme Unit-Load processes . . . used to reduce in-transit movement and to prevent chafing . . . are the "Skid Check" and "Key Roll."

Acme Unit-Load Method of bracing freight-car shipments of paper with tough steel bands is widely used because it is economical and practical. Unit-Load bands can be applied speedily with simple, low-cost tools by unskilled labor. Little or no dunnage is required and no expensive bracing materials are wasted. Loading and unloading cars is accomplished faster. Pool car shipments, separated and braced with Unit-Load bands, can be handled with maximum efficiency.

Millions of pounds of paper—in rolls and on skids; in cartons and cases—protected by Acme Unit-Load bands—are being shipped undamaged to all parts of the country . . . indisputable proof of the efficiency of this method of bracing.

Right now, Acme engineers, who have made Doc Steelstrap and Acme Unit-Load the bywords for product protection beyond the production line, are using their skill and ingenuity in helping Uncle Sam "pack it right to reach the fight." Soon, they hope, their full attention can be turned to making your new shipments of paper "Bound to Get There" wherever you may send them.



The photograph above shows cases of paper Steelstrapped to skids. These in turn are held firmly in the car by Acme Unit-Load bands. Skid-loads braced under the Vertical Anchor or Floating Load methods . . . with Acme Unit-Load bands . . . arrive at destinations in perfect order.

Silverstitch FOR SAFETY!

Fine papers deserve the protection of cartons which have Silverstitched end flaps, bottoms and tops. Cartons thus stitched offer sturdy resistance to every type of shipping hazard. Silverstitching on an Acme Silverstitcher is easy to do. Operators are able to work rapidly with minimum effort. Few moving parts . . . vital ones reversible . . . means long life and low maintenance costs. For complete facts about efficient, economical and guaranteed Acme Silverstitchers, write for informative folder.

ACME STEEL COMPANY
2818 ARCHER AVENUE, CHICAGO 8, ILLINOIS

Hemphill, Johns-Manville Company; *Piping and Tubing Materials Subcommittee,* S. B. Jones, West Virginia Pulp and Paper Company, and the *Water Committee,* L. B. Miller, W. H. & L. D. Betz Company.

Industrial Division: W. E. Brawn, Pejepscot Paper Company, General Chairman. There were no personnel changes in this division. The present chairmen are: *Industrial Engineering,* W. M. Shoemaker, Douglas T. Sterling Company; *Vocational Training Committee,* W. L. Cassidy, Hummel & Downing Company; *Fibrous Raw Materials,* John Traquair, Mead Corporation; *Nonfibrous Raw Materials,* E. N. Poor, American Cyanamid Company.

Converting and Consuming Division: J. D. Malcolmson, Robert Gair Company replaced Arno W. Nickerson, Consulting Engineer, as general chairman; *Coating Committee,* Werner Kaufmann, Kupfer Bros. Company; Arno W. Nickerson replaced J. D. Malcolmson as chairman of the *Container Committee.* R. H. Simmons replaced M. S. Kantrowitz (both of the Government Printing Office) as chairman of the *Graphic Arts Committee.* A new committee to be known as the *Structural Fibrous Materials Committee* was projected. This committee will deal with technical details concerning such materials as insulating and wall boards and insulating bats.

Research Development Division: F. W. Brainerd, Scott Paper Company succeeded D. W. McCready, University of Michigan, as general chairman; *Abstracts and Bibliography Committee,* C. J. West, Institute of Paper Chemistry; *Engineering Research Committee,* J. B. Gough, Mead Corporation succeeded D. W. McCready as chairman; *Fundamental Research Committee,* H. F. Lewis, Institute of Paper Chemistry; *Bacterial Control Methods Committee,* R. H. Torrey, Riegel Paper Corporation; *Patents Committee,* C. W. Rivise, Caesar & Rivise; *Plastics Committee,* E. C. Jahn, New York State College of Forestry became chairman of this new organized committee.

Pulp Manufacture Division: W. F. Gillespie, Gaylord Container Corporation succeeded S. D. Wells, Institute of Paper Chemistry as general chairman; *Acid Pulping Committee,* G. H. McGregor, Minnesota and Ontario Paper Company; *Alkaline Pulping Committee,* K. G. Chesley, Crossett Lumber Company; *Mechanical Pulping Committee,* R. M. Drummond, International Paper Company; *Pulp Purification Committee,* D. T. Jackson, Hammermill Paper Company; *Paper Deinking Committee,* F. C. Clark, Consulting Engineer, became chairman of this new committee and R. H. Stevens of the National Container Corporation became chairman of the new *Byproducts Committee.*

Paper Manufacture Division: Pierre Drewson, General Chairman; *Papermaking Committee,* A. E. Bachmann, Missisquoi Corporation; *Preparation of Nonfibrous Materials Committee.* This committee has been assigned to the New England Section to be operated as a Section activity. *Straw and Agricultural Cellulose Residues Committee,* S. I. Aronovsky of the Northern Regional Research Laboratory, U. S. Department of Agriculture.

Testing Division: Major J. d'A. Clark, Chicago Quartermaster Depot, General Chairman. E. R. Schafer, Forest Products Laboratory succeeded Major B. E. Lauer, Chemical Warfare Service as chairman of the *Fibrous Materials Testing Committee; Pulp Testing Committee,* L. V. Forman, Institute of Paper Chemistry; *Nonfibrous Materials Testing Committee,* W. F. Hathaway, Kalamazoo Vegetable Parchment Company; *Chemical Methods Committee,* B. L. Browning, Institute of Paper Chemistry; *Microscopy Committee,* F. A. Burningham, Brown Company; *Paper Testing Committee,* B. W. Scribner, Chairman; *Absorptiveness to Parrafin Subcommittee,* S. C. Fairbanks, Hamersley Manufacturing Company; *Testing Instruments Subcommittee,* E. J. Albert, Thwing-Albert Instrument Company; *Writing and Erasing Properties Subcommittee,* P. W. Codwise, Beaver Wood Fibre Company; *Water Penetration Subcommittee,* E. G. Mullen, American Reenforced Paper Company; *Water Vapor Permeability Testing Committee,* W. H. Graebner, Marathon Corporation. (This committee completed its assignment during the year and has been replaced by a *Packaging Materials Testing Committee* of a somewhat wider scope). Mr. Graebner is also chairman of a special task committee to develop testing methods for the Government procurement services; *Ordnance Wrapping Special Task Committee on Bearings Wraps* (joint with Society of Automotive Engineers), P. J. Massey, H. P. Smith Paper Company; Don L. Quinn, Consultant, succeeded Arno W. Nickerson as chairman of the *Container Testing Committee;* A. H. Group, Hammermill Paper Company succeeded M. N. Davis, Kimberly-Clark Corporation as chairman of the *Optical Properties Committee.*

Special Committees: G. E. Williamson, Strathmore Paper Company, succeeded George Carruthers, Interlake Tissue Mills, as chairman of the *Joint Textbook Committee; Research Appropriation Committee,* J. L. Parsons, Hammermill Paper Company; *Standards Committee,* R. C. Griffin, Aurthur D. Little, Inc.

LOCAL SECTION CHAIRMEN

Chairmen of local sections elected during the past year include: *Pacific,* Erik Ekholm, Puget Sound Pulp and Timber Company; *Lake States,* J. P. Weidner, Hoberg Paper Company; *Delaware Valley,* A. M. L. Bixler, Riegel Paper Corporation; *Kalamazoo Valley,* E. B. Taylor, Stein, Hall Company; *New England,* W. L. Foote, B. F. Perkins & Sons; *Ohio,* C. D. Roess, Wrenn Paper Company; *Empire State,* F. J. McCourt, International Paper Company; *Maine-New Hampshire Group,* Clifford Patch, Eastern Corporation; *Chicago Professional Paper Group,* Harry E. Weston, Fritz Publications, Inc.; and *Papermakers and Associates of Southern California,* Frank Wheelock, Fibreboard Products, Inc.

TAPPI Convention Papers

All of the papers included in the program of the Technical Association of the Pulp and Paper Industry, because of the cancellation of the convention, will be considered as presented by title and published in the association's media. In this way members will obtain the information offered and are urged to send to the Secretary of TAPPI such comments regarding these papers as they would have made at the various meeting sessions.

For the record, the titles of the papers that were included in the meeting program are given below. The date and time assignments are omitted.

COATING SESSIONS. (Werner Kaufmann, O. W. Calligan and P. J. Massey, Chairmen)

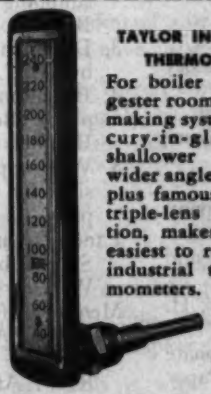
The Taylor Instruments you need for better production

HERE are some of the Taylor Instruments you need to increase production and eliminate waste in your plant. There's a Taylor Instrument or Automatic Control System for almost every pulp and paper process. Call your Taylor Field Engineer or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada. *Instruments for indicating, recording, and controlling temperature, pressure, humidity, flow and liquid level.*

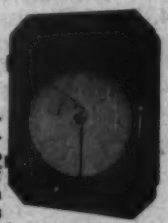
RECORDING FULSCOPE CONTROLLER
Provides close accurate control of temperatures in starch cooking, dryer section of paper machine, pulp digesters. This is the heart of the Taylor Pulp Grinder Temperature Control System. Quickly adaptable to any new process.

SELF-ACTING TEMPERATURE CONTROLLER
Simple, easy-to-use, inexpensive, with little or no maintenance cost. For controlling shower water temperatures, head box temperatures and miscellaneous batch processes. Requires no auxiliary air supply.

TAYLOR DIAL THERMOMETER
For remote indication of stock temperatures in storage chests and other points in the stock flow line. Mercury, vapor, or gas-actuated tube systems with a wide variety of bulb and stem connections.



TAYLOR INDUSTRIAL THERMOMETER
For boiler room, digester room and acid-making systems. Mercury-in-glass. New shallower case for wider angle of vision, plus famous "Binoc" triple-lens construction, makes this the easiest to read of all industrial type thermometers.



TAYLOR RECORDER
Pressure recorder for steam supply header to dryer section of machine, and on booster pumps to high pressure showers. Vacuum recorders for suction rolls and boxes and feed arrangement of printing presses. Liquid level recorders for stock and water storage tanks. Also press roll recorders to help keep sheets uniform.

WAR BONDS — SERIES E
Special! $100 value for only $75. Also available in denominations of $25, $50, $500, and $1000. If you've already bought one this month, get another. And keep the ones you have! They're *better* than cash in the bank!

ARMY E NAVY

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

Symposium on Paper Machine Coated Papers.

1. Use of Pyrodextrines in the Clay Coating of Paper by R. W. Kerr and N. F. Schink, Corn Products Refining Company.
2. Newer Starches for Paper Coating by C. C. Kesler and E. T. Hjermstad, Penick & Ford, Ltd.
3. Paper Machine Coating Processes and Equipment by F. W. Egan, John Waldron Corporation.
4. Raw Stock for Paper Machine and Conventional Coating by W. A. Kirkpatrick, Allied Paper Mills.
5. Paper Machine Coating's Contribution to the Graphic Arts, by H. N. Case, Sears, Roebuck Company.
6. The Future of Paper Machine Coating by P. J. Massey, H. P. Smith Paper Company.

Pulp Purification Sessions. (D. T. Jackson, Chairman)

Symposium on Present Practices and Post War Trends in Pulp Bleaching.

1. A Review of American Bleaching Processes and Equipment by R. P. Hill, Pulp Bleaching Corporation.
2. What is New in European Pulp Bleaching by E. C. Jahn, N. Y. State College of Forestry.
3. What is New in American Pulp Bleaching.
   a. Bleaching Process and Equipment by Viggo Ullmann, Sandy Hill Iron & Brass Works.
   b. Thickening and Washing Equipment for Pulp Bleaching by W. H. Pitkin, Oliver-United Filters.
   c. Use of Sodium Chlorite in Pulp Bleaching by G. P. Vincent, Mathieson Alkali Works.
   d. Sodium Peroxide Bleaching of Mechanical Pulps by J. S. Reichert, E. I. du Pont de Nemours, Inc.
4. Panel Discussion on New Bleaching Processes
   S. I. Aronovsky, Northern Regional Laboratory
   John Schuber, Solvay Sales Company
   G. H. Chidester, Forest Products Laboratory
   W. T. Webster, Brunswick Pulp and Paper Company
   Elmer Hinner, Hercules Powder Company
   William Stericker, Philadelphia Quartz Company

Alkaline Pulping Session. (K. G. Chesley and R. H. Stevens, Chairmen)

1. Present and Possible Uses for Tall Oil, by W. H. Jennings, Chesapeake-Camp Corporation.
2. Operation of a Rotary Lime Kiln in a Sulphate Mill, by E. A. Harper, Brunswick Pulp and Paper Company.
3. Heat Utilization in Rotary Kilns Burning Lime Sludge, by Ralph Gibbs, Consulting Engineer.
4. Refined Neutral Sulphite Semichemical Pulps From Douglas Fir, by H. E. Peterson, M. W. Bray and G. J. Ritter, Forest Products Laboratory.
5. The Addition of Synthetic Salt Cake to the Green Liquor, Rather Than to the Furnace, in Kraft Pulping, by G. P. Vincent, Mathieson Alkali Works, Inc.

Water and Bacterial Control Methods Sessions. (L. B. Miller and R. H. Torrey, Chairmen)

1. Ground Water Usage and Its Effect on Total Local Water Supply, by L. B. Miller, L. D. and W. H. Betz Company.
2. The Use of Activated Silica in the Coagulation of Highly Colored Water, by R. E. Noreus, Northwest Paper Company.
3. Mathematical Formulation of Stream Pollution Problems, by H. W. Gehm and C. J. Velz, National Council for Stream Improvement.
4. Relative Toxicity of Disinfectants Recommended for Use in the Paper Industry. II Inhibiting Concentrations for *Bacillus mycoides* and *Aspergillus niger*, by J. W. Appling and J. F. McCoy, Institute of Paper Chemistry.
5. Identification and Characteristics of Typical Slime-Forming Organisms, by R. B. Martin, Wallace and Tiernan, Inc.

Symposium on White Water Treatment

1. Waste Water and Fiber Recovery With Reclaimers of the "Precipitator" Type, by S. B. Applebaum and J. R. Rhinehart, the Permutit Company.
2. Waste Water Utilization by Clarification, by C. C. Porter and Charles Carpenter, Southland Paper Mills.
3. Clariflocculation of Mill Waters, by F. P. Lasseter and B. J. Queern, Dorr Company.
4. A Paperboard Mill's Attack on Stream Polution, by Thomas E. Brookover, Downingtown Paper Company.
5. Water Purification with Bentonite, by H. L. Olin and E. M. Myers, University of Iowa.

Containers Sessions. (Arno W. Nickerson, Chairman)

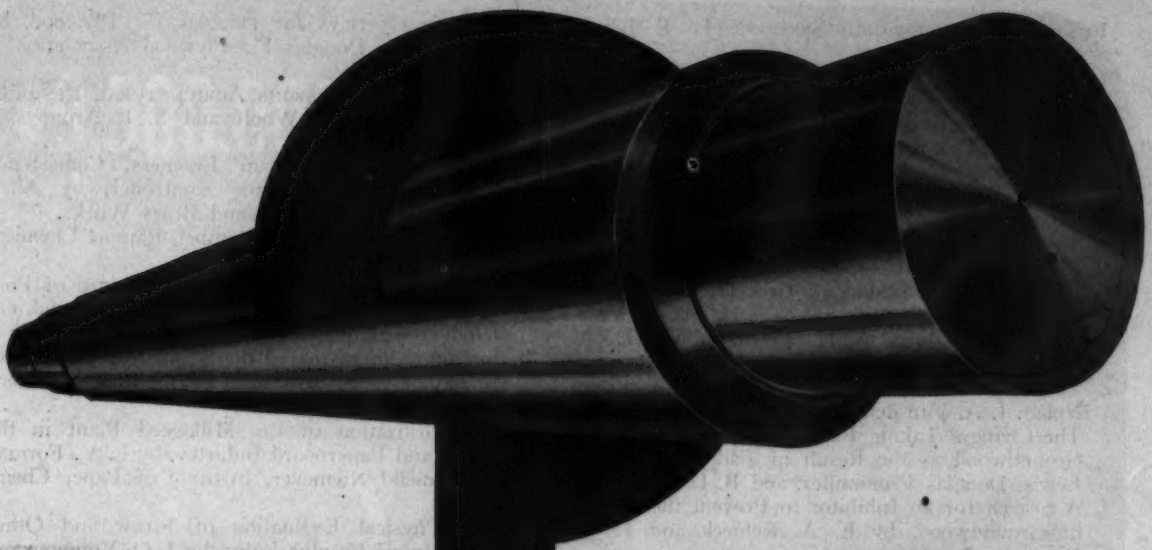
Symposium on Weatherproof Shipping Containers

1. Wartime Damage Claims Related to Fiber Shipping Containers, by Edward Dahill, Freight Container Bureau, Assoc. of Amer. Railroads.
2. Weatherproof Boxes, Development of Corrugated Shipping Containers and Post War Uses, by W. B. Lincoln, Inland Container Corporation.
3. Development of Weatherproof Solid Fiberboard, by H. T. Barker, Bird & Son, Inc.
4. Bituminous Emulsion Developments for Weatherproof Board, by E. M. Lorenzini, American Bitumels Company.
5. Weatherproofing Fiberboard with Asphalt Emulsion, by C. R. Mac Donald, The Flintkote Company.

Panel Discussion of Weatherproof Corrugated and Solid Fiber Containers Under Direction of Albert W. Luhrs, Industrial Consultant

Members of Panel:

W. M. Allen, The Mengel Company, Louisville, Ky.
R. P. Aument, American Box Board Company, Grand Rapids, Mich.
T. J. Gross, Container Testing Laboratories, Inc., New York, N. Y.
C. S. Huestis, Robert Gair Company, Inc., New London, Conn.
J. R. Little, The Hinde & Dauch Paper Company, Sandusky, Ohio
P. Miessler, Hankins Container Company, Cleveland, Ohio
H. L. Rammer, Fibreboard Products Inc., Stockton, Calif.
R. W. K. Ulm, The Ohio Boxboard Company, Rittman, Ohio
W. W. Wagner, Jr., Eastern Box Company, Baltimore, Md.
R. A. Wilkins, Bird & Son, Inc., East Walpole, Mass.
Albert Yraola, the Hinde & Dauch Paper Company of Canada, Ltd., Toronto, Ont.



HOW ACCURATE IS A ROLL CROWN OF 60/1000 OF AN INCH?

Accuracy of roll crown is as much a question of *shape* as of *amount* of crown. A large calender roll, of say 25 feet in length, may have an increase in diameter at the center of exactly sixty thousandths of an inch—the amount calculated to be necessary—and still not have an accurate crown.

For correct crown shape, the increase in diameter from ends to center must follow the true deflection curve and be symmetrical on both halves of the roll. Greatly exaggerated such a crown would look like this:

It can be readily understood that the crown cannot compensate for deflection, caused by the weight of the rolls above it and the loading, if its shape is irregular and unsymmetrical.

This is why we developed the Farrel two-wheel, swing-rest roll grinder with the Farrel automatic crowning device, which unerringly produces the correct roll shape and amount of crown required; and Farrel roll calipers that measure diameter and crown with "more-than-human" accuracy—so you will know that the crown is *right* when you buy rolls from *America's largest specialty roll shop*, at Ansonia.

Send for further details of Farrel rolls or of any of the other equipment listed on this page.

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FARREL PAPER MILL MACHINERY

ROLLS: Chilled Iron, Dry Sand, Meehanite, Alloy Iron, Steel, Chromium Plated
FOR: Calender Stacks
Board Calenders
Super Calenders
Glassine Calenders
Friction Rolls
Breaker Rolls
Smoothing Rolls
Coating Rolls
Creping Rolls
Plater Rolls
Cutting Rolls
Paraffining and Waxing Rolls
Saturating Rolls
Silicating Rolls
Miscellaneous Special Purposes
CALENDERS: Paper and Board
GRINDING MACHINES: Roll
CALIPERS: Roll
GEARS, CUT: Spur, Single and Double Helical (Farrel-Sykes Continuous Tooth Type)
SPEED REDUCING GEAR UNITS
SPEED INCREASING GEAR UNITS
FLEXIBLE COUPLINGS

Farrel-Birmingham

FUNDAMENTAL RESEARCH SESSION. (H. F. Lewis, Chairman)

1. The Influence of Methylation on the Behavior of Paper Fibers Toward Basic Dyes, by Charles M. Sigvardt, Marinette Paper Company.
2. Oxidants That Promote the Dialdehyde Cleavage of Glycols, Starch, and Cellulose, by L. J. Heidt, E. K. Gladding, and C. B. Purves, McGill University.
3. The Hot Alkaline Purification of Cellulose, by Alexander Meller, Australian Paper Mfgrs. Ltd.

Symposium on the Fading of Groundwood

1. A Study of the Relation Between Handsheet Variables and Fading, by H. F. Lewis and E. A. Reineck.
2. The Physical Mechanism of Fading, by Philip Nolan, J. A. Van den Akker, and W. A. Wink.
3. The Changes Taking Place in the Components of Groundwood as the Result of Fading, by H. F. Lewis, Douglas Fronmuller, and B. L. Browning.
4. A Search for an Inhibitor to Prevent the Fading of Groundwood, by E. A. Reineck and H. F. Lewis.
5. Inhibition of Fading Through the Use of Ultraviolet Absorbing Compounds, by Philip A. Nolan.

ENGINEERING SESSION. (Roderick O'Donoghue, Chairman)

1. Artificial Pulpstones, by J. E. Perry, Norton Company.
2. The Guiding of Felts (or Wires), by J. B. Gough, Mead Corporation.
3. Black Liquor Recovery Processes, by C. J. Sibler, West Virginia Pulp & Paper Company.
4. Heat Recovery from Digester Blowdown and Relief in Sulphate and Soda Mills, by J. B. Ogden, Foster Wheeler Company.
5. Evaporation, by J. R. Lientz, Swenson Evaporator Company.
6. Electronic Dehydration of Paper by Charles Stevens, The Morrow Manufacturing Company.

PLASTICS SESSIONS. (E. C. Jahn, Chairman)

1. Identification of Melamine and Urea Resins in Wet Strength Paper, by R. W. Stafford, W. M. Thomas E. F. Williams and N. T. Woodberry, American Cyanamid Company.
2. Study of Melamine Resin Process for Producing Wet Strength Paper, by C. G. Landes and C. S. Maxwell, American Cyanamid Company.
3. Paper Base Laminates for Electrical Insulation, by L. V. Larson, General Electric Company.
4. The Treatment of Paper or Paperboard with Phenolic, Urea, Silicone, Acrylic and Other Resins, by F. W. Egan, John Waldron Corporation.
5. Fabrication and Properties of High Strength Laminated Paper Plastics, by G. H. Chidester and P. K. Baird, Forest Products Laboratory.
6. The Preparation and Application of Pulp Preforms, by R. H. Mosher, N. T. Samaris, and L. M. Debing, Monsanto Chemical Company.
7. Pulps for Pulp Reinforced Plastics, by S. L. Schwartz, J. C. Pew, and H. R. Meyer, Forest Products Laboratory.
8. Laminants and Coatings for Papers, Plastic Films, and Metal Foils, by F. B. Speyer, American Resinous Chemical Corporation.
9. The Use of Various Papers in Laminates, by R. W. Barber, St. Regis Paper Company.
10. Plastic Overlays for Douglas Fir Plywood, by J. D. Long, Douglas Fir Plywood Association.

PAPERBOARD AND FIBROUS AGRICULTURAL RESIDUES SESSION (W. W. Woolf and S. I. Aronovsky, Chairmen)

1. Application of Witham Freeness, Consistency Recorder and Automatic Controller, by Allan Lowe, Sandy Hill Iron and Brass Works.
2. Slime Control, by L. J. Rampel, Rampel Chemical Company.
3. Chemical Defoamers in the Manufacture of Pulp and Paper, by W. B. Morehouse, National Oil Products Company.
4. Sodium Aluminate and the Sulphate Ion in Paper Sizing, by W. S. Wilson, Monsanto Chemical Company.
5. The Utilization of the Milkweed Plant in the Paper and Paperboard Industry, by L. V. Forman and Donald Niemeyer, Institute of Paper Chemistry.
6. The Physical Evaluation of Straw and Other Agricultural Residue Pulps, by J. O. Younger and S. I. Aronovsky, Northern Regional Research Lab.
7. Agricultural Residue Pulps for Corrugating—Effects of Weathering and of Various Cooking Conditions, by S. I. Aronovsky, J. O. Younger and G. H. Nelson.
8. Paperboard Production Qualities of Cereal Straws, by H. C. Koch, The Auglaize Box Board Company.

GRAPHIC ARTS, OPTICAL PROPERTIES AND PAPER TESTING SESSION. (R. H. Simmons, A. H. Croup, and B. W. Scribner, Chairmen)

1. Map Making, by Warren C. Crump, Hydrographic Office.
2. Plastic Printing Plates, by W. C. Tolland, Plastolith Company.
3. Letter Press Printing Plates, by Eugene Williamson, Bakelite Corporation.
4. Ink Coverage—Determination and Relation to Printability, by Rolf Buchdahl and Margaret F. Polglase, General Printing Ink Company.
5. The Establishment of Light Standard Testing Methods for the Paper Industry, by H. A. Lips, E. I. du Pont de Nemours, Inc.
6. Modified Pen and Ink Sizing Test, by B. W. Smith, the Todd Company.
7. Determination of the Erasing Quality of Paper, by P. W. Codwise, Beaver Wood Fibre Company.
8. Observation on the Difficulties and Methods of Pen Ruling, by F. S. Klein, Byron Weston, Company.

TESTING SESSION. (B. W. Scribner, Chairman)

Container Coordinating Committee, War Production Board. Project on Investigation of Caseliners for Overseas Shipments

1. Description of Project, by H. A. Wolsdorf, Container Coordinating Committee.
2. Testing Caseliners, by E. R. Stivers, Package Research Laboratories.
3. Testing of Caselining Papers by C. G. Weber, National Bureau of Standards and E. G. Mullen, War Production Board.

TESTING SESSION (Major J. d'A. Clark, W. H. Graebner and Don L. Quinn, Chairmen)

Reports on Joint Army-Navy and Government Agencies Testing Program

$9,500,000.00 POST WAR PROGRAM

BROWN COMPANY LOOKS AHEAD

While working for war, we have been planning for peace. And we think our planning is sound. It is based on two invaluable assets:

First: On the past achievements and current developments of a Research Department that has consistently pioneered in the discovery of new products.

Second: On a reservoir of production experience and "know-how" that is unsurpassed in the paper industry.

These cooperating forces, in the pre-war period, made possible Solka Alpha, Cellate and hardwood sulphite pulps; Duracel, Nibroc White and Solkacel papers; and Nibroc Aqualized towels. For the war, they have developed gas mask filters and special wet strength papers.

These facilities are ready once more to convert test tube triumphs into commercial scale production when limitations on raw materials and equipment are lifted.

Topping all this is a thoughtfully planned program of modernization of mills and physical equipment that involves the expenditure of some $9,500,000.00.

We do not think the war is over yet by any means. But when it is, Brown Company will be ready to serve the paper industry better than ever.

NORTHERN SPRUCE NORTHERN BIRCH RESEARCH LEADERSHIP MANUFACTURING PRECISION

BROWN COMPANY

FOREMOST PRODUCERS PURIFIED CELLULOSE

SALES OFFICES: 500 FIFTH AVE., N.Y.C. ~ *MILLS:* BERLIN, N.H. & LA TUQUE, P.Q.

B. W. Scribner Is Presented TAPPI Medal For Outstanding Service to Industry

In presenting the TAPPI medal to Bourdon W. Scribner, Major James d'A. Clark spoke as follows:—

The Bylaws of the Technical Association of the Pulp and Paper Industry authorize the presentation of an award to one whose achievements have definitely contributed to the technical progress of the pulp, paper and paperboard industry. Today I am privileged, as one who has worked very closely with the recipient for many years, to make the presentation of the medal on behalf of the association.

B. W. Scribner, who is a native of Pennsylvania, graduated in chemistry at the Pennsylvania State College. He was inducted into the art and mystery of pulp and paper manufacture at that excellent firm, the West Virginia Pulp and Paper Company, where he remained for over a dozen years directing the testing and control of raw materials and the finished products, and also doing research work in pulp and papermaking.

After some time at the National Bureau of Standards, Mr. Scribner became Chief of the Paper Section of the Bureau in 1925, following Mr. F. C. Clark. Since that time, with the very able assistance of Dr. F. C. Carson, Mr. C. G. Weber, and others, a number of very successful and fruitful investigations dealing with papermaking and testing problems have been carried out; notably on offset printing, litho papers, the preservation of records, currency paper, and on many problems involving the development of paper testing procedures and instruments. He is the author and joint author of a large number of technical papers as wel as the chapter on physical tests of paper in Volume V of "The Manufacture of Pulp and Paper" and the revised edition of Paper Testing Methods published by TAPPI in 1938, a forerunner of the present loose-leaf volume of TAPPI Standards.

For many years, Mr. Scribner has been very active in the development of Federal Specifications for papers and paper products as chairman of that committee; also he has made contributions as a member of the committee on Government rinting Office specifications. With his influence and association with government specifications for paper and paper products, he has done much to enhance and publicize the value of the standardization work carried out by TAPPI and secure the official recognition of this work in many government specifications and publications.

B. W. Scribner
Recipient of TAPPI Medal

James d'A. Clark
Who Presented TAPPI Medal

In 1925, twenty years ago, he became chairman of the Paper Testing Committee of TAPPI and has enormously furthered the pioneering and development work of new test methods. He has devoted much of his time, and his spare time, too, to the difficult job of securing the coordination of the efforts of a large and able TAPPI committee, composed of members having widely divergent views, with very successful results. The work of this committee has been much more effective in bringing about an increase in quality and other developments in the manufacture of paper than is generally realized.

No consistent and sustained progress can be made in any technical endeavor unless the results can be measured and expressed numerically. The more accurately one can measure the results, the easier it is to connect slight deviations or improvements in quality with slight changes in the manufacturing procedure. Once a correlation between cause and effect has thus been established, the way to an improvement becomes obvious. There can be no papermaker here today, who has not sometime in the last two decades been able to effect some improvement in some quality or the uniformity of his product by the process just described. Thus were it not for the development and standardization of testing procedures for the qualities of paper, except by accident, technical progress in the pulp and paper industry towards improving the quality of their products would be utterly imposible. In that respect, we would be back to the "good old days"

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MILLS:

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when "what was good enough for grandpa is good enough for me."

No additional stress need be laid on the very great and obvious boon that the existence of standard test methods has been to Army and Navy personnel in preparing specifications for military use. It is no accident that the American technique of military packaging and packing is, in proportion, about as far ahead of that of any other nation as is the prevaelnce of nationally recognized standard methods of testing. I may add that the existence of a few internationally agreed standards of testing has been of immeasurable help in corerlating our efforts with those of our Allies, and the more we can do towards international standardization in the future, the better off everyone will be, not only in war, but also in peace.

A minor achievement of Mr. Scribner's which also should be recorded, is his successful handling of the chairmanship of the Testing Division. You will remember that a couple of years ago, during the medal presentation to Harry Fletcher, Bob Wolf recalled the Scot who said, "I am willin' tae be convinced, but I ha' yet taw see the mon wha' could dae it." Well here is a man who at least has done and can do it occasionally.

Mr. Scribner, it gives me much pleasure to present the TAPPI gold medal to you on behalf of the Technical Association of the Pulp and Paper Industry.

Remarks of B. W. Scribner

In accepting the TAPPI medal, B. W. Scribner, chief of the Paper Section of the National Bureau of Standards, Washington, D. C., responded as follows:

I wish to thank the members of the Executive Committee for the award of the TAPPI medal to me and to express my very deep appreciation of the honor. I appreciate it not only as a personal tribute but as a tribute as well to my colleagues at the National Bureau of Standards and members of the Technical Association of the Pulp and Paper Industry who have been associated with me in the development of technical knowledge relating to paper and papermaking.

The National Bureau of Standards has been closely associated with TAPPI from the time the Association was organized in 1915, as the Bureau recognized the identity of the aims of the two organizations in promoting standards for paper and furthering technical knowledge in general in the paper industry. The excellent cooperation the Bureau has always received from TAPPI, both as an organization and from individual members, has been most helpful in both research problems and standardization activities, and I wish to take this public opportunity to express my appreciation of it.

The important, long-range researches in the paper section of the Bureau are planned and carried out with the advice of representatives of outside organizations particularly interested. Much of the research has had the cooperation of committees composed in whole or in part of TAPPI members. This has assisted materially in the development of the Bureau literature on paper and related subjects comprising now nearly 200 articles dealing with papermaking materials and processes, properties and testing of paper, use of paper in printing, permanence and preservation of aper and records, and standards of quality for papers, paper products and related materials. A large amount of information developed by research and testing in the paper section is not of a nature to warrant publication in articles but much of its is published in news releases. Information of this kind results from such work as development of Federal Specifications, assistance in development of papers required by the Government for special purposes, and short investigations made to supply answers to inquiries received. We are fortunate in having capable key men of long experience in the work of the paper section, whose names are well known to you—M. B. Shaw for his tudies on papermaking problems, C. G. Weber for his work on quality and performance standards, and F. T. Carson for his development of paper testing standards.

I wish to congratulate the Association on the hearty support it has given to the development of standards and its achievements in this respect. Naturally, being a member of an organization that has standards as its chief business, I believe that this is the most valuable contribution to paper technology that has been made by TAPPI, and it has been made possible only by the unselfish devotion to it of TAPPI technicians and the heads of their organizations. Much of the research and testing required for the development of the standards is done in commercial laboratories. R. C. Griffin's work in this field, as Chairman of your Standards Committee, is outstanding.

When I accepted the Chairmanship of the TAPPI Paper Testing Committee in 1925, it was with the provision that paper testing methods would be written up in standard form and that the Association would set up machinery for making them official Association methods. This plan had been previously recommended by F. C. Clark in his 1922 annual report of the Paper Testing Committee. My proposal was accepted by the President, George Spence, the Secretary, W. G. McNaughton, and the Executive Committee. Under the Chairmanship, successively, of F. C. Clark and F. A. Curtis, former chiefs of the Bureau's paper section, a number of methods had already been developed by the committee and descriptions of them published by the Association. These proved of much assistance in the initial standardization of methods. The system first set up for this purpose was very simple. As soon as a method was developed by the Paper Testing Committee, and approved by a majority of its members, it was distributed by the secretary of the Association for the vote of the members on adoption as an official method. As the work expanded in the development of paper testing standards and other kinds of standards, it became necessary to improve the system, and finally the present set-up of a Standards Committee and divisions dealing with different kinds of standards, and other improvements, were evolved. This system is working very satisfactorily.

There are now 63 TAPPI methods for testing paper and paperboards and back of them is a vast amount of research and testing so that on the whole they are good. The frequent revisions of them show that they are under constant scrutiny and that every advantage is taken of experience in their use, and of advancement in technical knowledge, to improve them. In his published notice of the award of the TAPPI medal to me, your secretary made the following statement: "The existence of these established and universally recognized testing methods has been a direct contribution to the war effort in their use in preparing the Army and Navy paper and packaging materials specifications, since but little time or technical manpower had to be utilized during the emergency by the Government procurement agencies in developing uniform acceptable test procedures." Because of my

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close association with the Federal Specifications as Chairman of the committee for paper and paper products, and as a consultant for other special specifications for such supplies required by the Army, Navy, and other war agencies, I can testify to the truth of this, and would add that the procurement of this kind of war materials of satisfactory quality would have been seriously delayed had the TAPPI testing methods not been in existence. They assist the purchaser of paper in definite specification of what he wants and this gives the papermaker something definite to work to.

Most of the results of the work of the National Bureau of Standards on paper testing has been incorporated into TAPPI testing methods and this is appreciated by the Bureau as the results are thus made more effective than they would be otherwise. The establishment of the Institute of Paper Chemistry by the paper industry assisted materially in the development of the TAPPI testing methods. The extensive researches of the Institute in this field have been productive of much information of great value. In closing I wish to take this opportunity to gratefully acknowledge the invaluable assistance in the work of the Paper Testing Committee, of your Secretary, R. G. Mcdonald; R. C. Griffin, Chairman of the Standards Committee; James d'A. Clark, Chairman of the Testing Division, and all the members, past and present, of the Paper Testing Committee and sub-committees.

Salvages 21,000,000 Pounds of Cartons

Demands on the nation's critically depleted stock of paper board containers were eased to the extent of nearly 21,000,000 pounds during the last year as a result of carton salvage collections by Schenley Distillers Corporation, it was reported today by Carl J. Kiefer, vice president in charge of production.

The 10,500 ton total, according to the announcement, represents the saving effected since the company's extensive conservation and reclamation program was intensified in January, 1944. At that time the salvage campaign was set up on a 45-state basis to encourage a maximum return of reclaimable cartons for re-use, in the face of the rapidly developing shortage of all paper and paper board materials imposed by steadily mounting shipments of military supplies.

In terms of materials released for transport overseas, Mr. Kiefer estimated that the containers recovered and returned to use by the company during the year represented the replacement of sufficient paper board for the manufacture of 8,000,000, 75mm. artillery shell casings, and an additional 32,500,000 Army "K" ration packages.

Under the company's intensively forstered recovery system, which follows the plan of operation suggested in the conservation plan drawn up for the distilled spirits industry four years ago by Lewis S. Rosenstiel, Schenley board chairman, corrugated pads, liners and partitions, as well as cartons, are collected from wholesalers and retailers and returned to regional plants for reconditioning and eventual reuse. Material that is torn or damaged beyond possibility of repair at company plants is routed to scrap dealers and paper mills.

High point of the 1944 campaign, Mr. Kiefer said, was reached in the company's Lawrenceburg, Ind., plant, where, during a 30-day period, 85 per cent of all outgoing shipments were packed in reconditioned cartons.

Appointed Industrial Forester

Robert N. Hoskins has been appointed Industrial Forester for the Seaboard Railway, Dallas T. Daily, general industrial agent of the railroad, announced from Norfolk last week.

Born in Iowa, Mr. Hoskins was educated at the University of Missouri and Iowa State College. Upon graduating from the latter institution with a B.S. Degree in forestry, he accepted a position with the Missouri State Conservation Commission. In January 1942, Mr. Hoskins became associated with the Florida Forest and Park Service in the capacity of extension forester. His activities in that connection were largely concerned with matters of education, information and publicity and were statewide in scope.

Mr. Hoskins' present appointment represents active continuation of a forestry program inaugurated by the Seaboard in 1937 and which was designed to promote sound forestry practices in its territory. In the six southeastern states — Alabama, Florida, Georgia, North Carolina, South Carolint and Virginia —served by Seaboard, there are 182,000,000 acres of land area of which more than -00,000,000 acres are forested. No other area in America possesses greater forest resources. Approximately 1,500,000 people in these states are dependent upon some phase of the wood industry for their livelihood.

Since 1935 nine large pulp and paper mills, involving investments approximating $70,000,000 have been located on Seaboard rails at various points from Virginia to Florida.

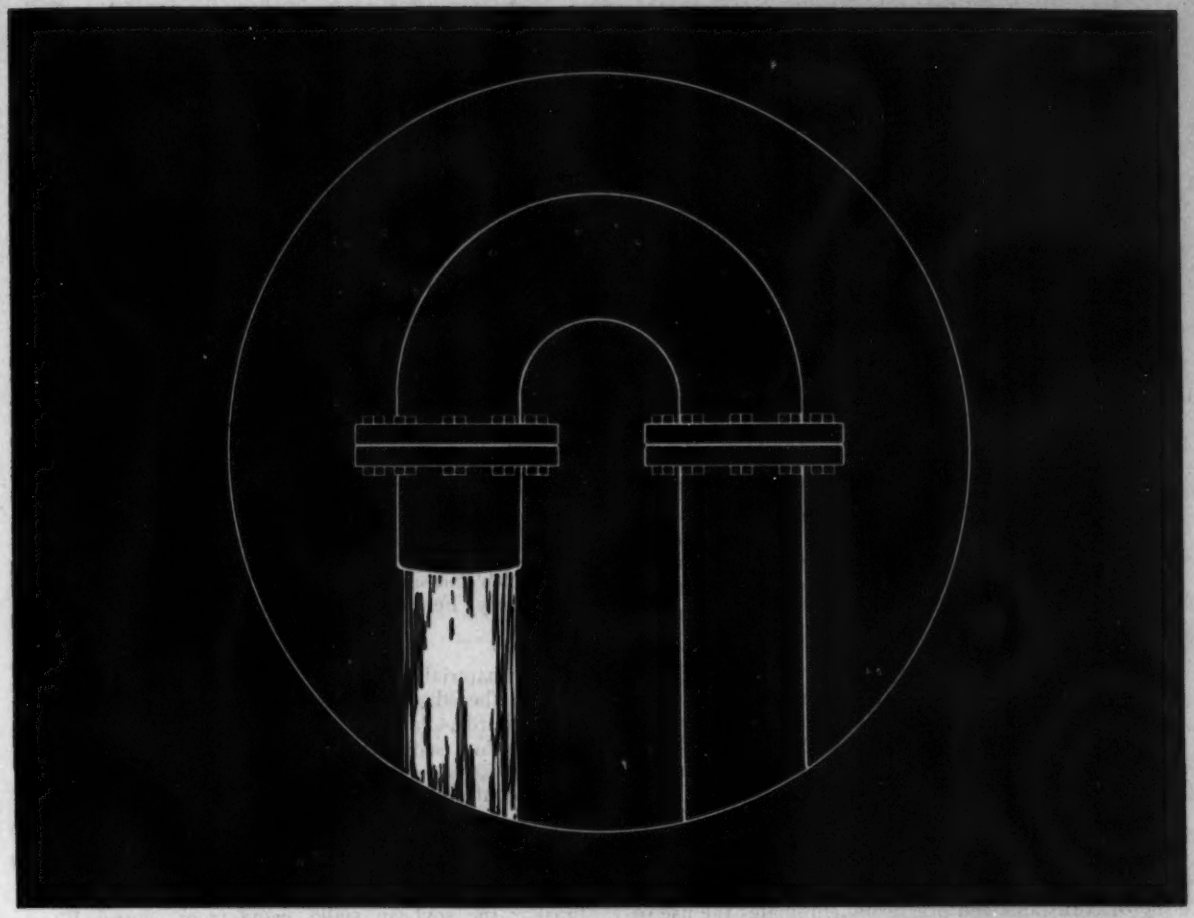
Process Equipment Design

D. Van Nostrand Company, Inc., has just issued a 580-page (6x9) illustrated book entitled, Process Equipment Design by Herman C. Hesse and John H. Rushton of the University of Virginia. This book is essentially for chemical engineers but starts with the basic principles that govern all engineering design, such as mechanics, strength of materials, and structural analysis. From these fundamental facts, the book develops practical methods for the design of the widest range of chemical engineering equipment such as pressure vessels, piping, gearing, shafting and bearings, belt and chain drives, attachments and closures. All the necessary engineering data is presented most conveniently for instant reference in charts and tables. There are more than 100 tables to furnish every figure needed in preparing designs or solving problems. It is one of the most useful books that has appeared for use of engineers who are concerned with a wide range of construction problems and need a clear and ready source of information as to how to proceed without having to refer to a number of handbooks.

Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 E. 42nd street, New York 17, N. Y. at $7.50 per copy.

Cochrane Awarded Second Star

The employees and management of the Cochrane Corporation, Philadelphia manufacturer of water conditioning apparatus, steam power plant equipment and flow measuring instruments, have been notified by the Navy Department of the second renewal of the "E" Production Award granted last February, signified by the addition of a second star to their "E" pennant.



Slime-free Pipes

"ALWAYS OPEN FOR BUSINESS" describes the slime-free pipes in those mills using "Lignasan"—the powerful bactericide and fungicide that controls slime-forming bacteria in unbleached sulphite pulp systems.

When you add "Lignasan" to your pulp, you reduce clogging of pipes, screens and rifflers . . . you cut down on the time and labor spent on washups and cleanings . . . you safeguard stock against bacterial and fungous attacks . . . you protect sugars, starches and adhesives from decomposition by bacteria.

"Lignasan" is extremely effective even in low concentrations. Added at the beater in powder form, 3 to 5 ounces per ton of dry fiber usually can be relied upon to control slime throughout the *entire* "wet" paper-making cycle. Or, "Lignasan" may be bled into the system at *any* point where slime formation tends to be excessive.

Many mill operators have credited "Lignasan" with substantial savings. Get the facts *today* on how "Lignasan" can help *you* curb profit-stealing slime, cut production costs and keep your mill at peak operating efficiency. Write our nearest branch office or E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington 98, Delaware.

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Preserves pulp

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Agricultural Residue Pulps for Corrugating Effects of Weathering and of Various Cooking Conditions*

By S. I. Aronovsky[1] J. O. Younger[2], and G. H. Nelson[3]

Abstract

Sound and weathered wheat and rice straws, barley straw, soybean stalks, hemp hurds, flax shives, sugarcane bagasse, and sedge grass were analyzed and pulped by the lime-soda method. Solubility of the raw material in 1% NaOH seems to give a fair indication of its degree of weathering. The yield and strength of straw pulp decrease with increasing degree of weathering. Sound straw from soft winter wheat of the mid-Central states appeared to be the best of the raw materials for the production of corrugating paper.

The present shortage of wheat straw and of other cereal straws for the manufacture of 9-point corrugating and container board has focused the attention of the board industry on the use of other raw materials. These alternate raw materials include soybean stalks, sugarcane bagasse, flax shives, hemp hurds, cornstalks, cottonstalks, and other agricultural residues, as well as waste paper stocks. While all of these materials are potentially suitable for the production of corrugating board, the present lack of appropriate equipment makes difficult the harvesting and collecting of cornstalks and practically eliminates the use of cottonstalks. Both of these residues are produced annually in very large amounts.

Obviously, the first step in a period of shortage is to conserve and make the fullest use of that essential material which is scarce. In the case of strawboard manufacture this means preserving the available straw or other residues from attack by microorganisms and by the elements, and obtaining the highest possible yield of pulp from this raw material. The next step is the search for some available material or materials which can be used to replace the scarce item wholly or in part, without involving too many modifications in operation and equipment.

This paper describes preliminary work on the evaluation of several agricultural residues for strawboard manufacture, including proximate analyses of weathered and sound straws, and some pulping data. A portion of this work was discussed informally at the Straw Session at the TAPPI meeting in New York City, February 1944.

Raw Materials

The materials included in this study were sound and weathered wheat and rice straws, soybean stalks, hemp burds, flax shives, barley straw, sugarcane bagasse, and sedge or "wool" grass. The weathered wheat straws were obtained from several locations in a commercial 2-year-old rick in Ohio. The weathered rice straw (presumably from Arkansas) was taken from a 2-year-old rick in Indiana. The sound wheat straws came from South Dakota and central Illinois. The barley straw was stack straw from Nebraska; the soybean stalks came from central Illinois; the hemp hurds, from southern Wisconsin; the flax shives, from southern Minnesota; and the Louisiana bagasse, from a bale stored under normal commercial conditions. The sedge grass, *Scirpus cyperinus*, was obtained from a Wisconsin county agent who estimated that about 50,000 tons of this material are available in 10 counties alone in the lowlands of that state. All materials were received in air-dried condition, except the badly weathered wheat straw which was air-dried on arrival to about a 20% moisture content.

The hemicellulose (pentosans), cellulose, and lignin contents, solubility in 1% NaOH solution, and some other analytical characteristics of these raw materials as determined with TAPPI methods are given in Table I. Bagasse and the cereal straws with the exception of rice straw form a group containing ap-

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* Presented by title at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 19-22, 1945.

[1] Member TAPPI; Chemical Engineer, in charge of Pulp and Paper Section, Agricultural Residues Division, Northern Regional Research Lab.,[4] Peoria, Ill.

[2] Paper Technologist, Pulp and Paper Section, Northern Regional Research Lab., Peoria, Ill.

[3] Chemist, Pulp and Paper Section, Northern Regional Research Lab., Peoria, Ill.

[4] One of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

TABLE I.—PROXIMATE ANALYSIS OF VARIOUS AGRICULTURAL RESIDUES[1]

Raw Material											
Material	Crop Year	Condition	Moisture %	Ash %	Alcohol-Benzene Solubility %	Hot-Water Solubility %	1% NaOH Solubility %	Lignin %	Pentosans %	Cross and Bevan Cellulose %	Alpha Cellulose %
Wheat straw	1943	Combined, sound, bright (Ill.)	9.1	9.0	4.5	11.9	44.1	20.1	27.6	49.1	34.8
Wheat straw	1943	Threshed, sound, bright (Ill.)	6.7	6.7	3.5	11.5	39.2	20.8	29.6	51.7	35.8
Wheat straw	1943	Threshed, sound, bright (S. Dak.)	14.2	12.0	3.4	19.7	51.4	18.1	28.1	45.5	29.1
Wheat straw	1941	Slightly weathered	9.8	9.3	4.0	11.5	43.9	17.8	27.8	49.2	33.9
Wheat straw	1941	Medium weathered	9.6	8.1	4.0	12.5	47.3	21.5	25.3	43.1	29.2
Wheat straw	1941	Badly weathered	45.0	19.7	3.1	21.0	64.3	34.0	15.7	34.4	15.4
Rice straw	1943	Sound, bright (Ark.?)	8.1	18.8	4.6	14.6	50.9	13.1	23.4	46.1	27.9
Rice straw	1943	Weathered	9.8	22.3	2.6	13.3	49.8	16.6	21.0	42.6	29.0
Barley straw	1942	Sound, bright (Nebr.)	10.7	7.9	4.7	19.5	48.4	14.6	28.6	47.5	31.7
Soybean stalks	1942	Combined, sound (Ill.)	8.7	2.8	3.1	9.6	31.1	19.8	23.4	50.5	36.4
Sugarcane bagasse	1940	Sound (La.)	10.6	6.3	4.0	9.1	36.1	19.6	28.4	55.0	40.6
Hemp hurds	1942	(Wis.)	8.1	3.4	3.7	3.2	27.2	25.2	24.7	51.1	36.0
Flax shives	1942	(Minn.)	9.3	3.5	3.6	10.2	31.9	29.1	25.4	44.6	30.6
Sedge grass	1943	(Wis.)	9.1	4.7	4.6	8.1	44.7	27.3	26.0	46.0	33.8

[1] All values except moisture content are based on the moisture-free materials.

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The printer is not the only one who has discovered that opacified light-weight papers impose no war-time hardship. He likes them, and so do all types of paper users who find many advantages in them which the pre-war heavier papers did not possess. The buying of paper by area instead of by pounds may become a permanent practice.

In this situation the notable characteristics of TITANOX pigments stand out as a beacon light to guide the paper manufacturer. Their unexcelled opacity, whiteness and brightness permit production of the kinds of paper favored by consumers—papers of unimpaired strength and with fine printing or writing surfaces—papers that resist after-yellowing.

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TABLE II.—COOKING CONDITIONS, YIELDS, AND PHYSICAL CHARACTERISTICS OF AGRICULTURAL RESIDUE PULPS

Cook No.	Raw Material	Cooking Conditions: Chemicals CaO %	NaOH %	Other %	Max. Temp. °C.	Time at Max. Temp. Hours	Yields [1]: Washed Pulp %	Fines [2] %	Total Pulp %	Physical Properties of Pulps (TAPPI): A—at 400 ml. S.R. Freeness; B—at Maximum Burst: Beating Time A min.	Beating Time B min.	Schopper-Riegler Freeness A ml.	Schopper-Riegler Freeness B ml.	Bursting Strength A pts./100 lb.	Bursting Strength B pts./100 lb.	Tear [3] Resistance A g.	Tear [3] Resistance B g.	Tensile [4] Strength A kg.	Tensile [4] Strength B kg.	Density A g./ml.	Density B g./ml.
6 Cooks	Combined wheat straw, bright, sound (Ill.) (1943)	6.0	1.5	..	140	5	74.5-76.5 Av. 75.6	14.4-16.9 Av. 15.6	90.3-91.4 Av. 91.0	40-60 Av. 44	30-60 Av. 40	400	590-255 Av. 430	42-48 Av. 45	43-49 Av. 46	19-21 Av. 20	17-24 Av. 20	4.5-5.1 Av. 4.8	4.1-5.1 Av. 4.7	.38-.41 Av. .40	.36-.42 Av. .40
248	" " "	6.5	1.0	..	135	7	73.1	21.6	94.7	46	60	400	350	48	50	22	19	5.1	4.8	.40	.37
225	" " "	4.0	..	Na_2CO_3 4.5	126	4.25	73.3	11.8	85.1	41	30	400	490	45	46	23	24	4.6	4.6	.36	.32
249	" " "	4.5	0.85	..	135	7	70.5	19.6	90.1	45	30	400	480	50	53	23	26	5.3	4.6	.40	.36
237	" " "	..	4.0	..	140	5	66.0	13.2	79.2	60	90	400	265	54	58	20	16	5.6	5.6	.38	.46
238	" " "	..	3.0	Na_2S 1.0	140	5	66.0	10.7	76.7	49	75	400	375	51	54	22	21	5.5	5.6	.40	.46
250	Threshed wheat straw, bright, sound (Ill.) (1943)	6.0	1.5	..	140	5	72.7	16.2	88.9	55	30	400	560	50	51	20	22	5.3	4.9	.44	.38
251	" " "	4.6	0.85	..	135	7	75.4	14.3	89.7	55	75	400	280	53	57	19	16	5.6	6.0	.42	.46
253	" " "	6.5	1.0	..	135	7	74.3	16.5	90.8	49	60	400	330	45	50	19	17	5.4	5.3	.42	.52
246	Threshed wheat straw, bright, sound (S. Dak.) (1943)	6.5	1.0	..	135	7	64.1	14.8	78.9	23	45	400	320	31	35	17	13	3.8	4.2	.40	.39
252	" " "	4.5	0.85	..	135	7	55.9	13.7	69.6	27	45	400	330	36	37	16	15	4.2	4.2	.46	.47
255	" " "	6.0	1.5	..	140	5	60.6	22.7	83.3	25	45	400	320	38	43	18	18	4.2	4.4	.41	.45
230	Wheat straw, slightly weathered (Ohio?) (1941)	6.0	1.5	..	140	5	76.5	11.7	88.2	52	45	400	450	52	56	20	19	4.4	4.3	.47	.42
227	Wheat straw, medium weathered (Ohio?) (1941)	6.0	1.5	..	140	5	71.0	15.6	86.6	30	45	400	310	35	37	20	22	4.0	4.0	.40	.48
236	" " "	..	4.0	..	140	5	57.9	12.8	70.7	43	30	400	490	43	49	20	24	5.2	4.8	.40	.39
226	Wheat straw, badly weathered (Ohio?) (1941)	6.0	1.5	..	140	5	...	...	66.1 [5]	..	..	...	...	..	..	..	..	..	..	..	..
235	" " "	6.0	..	..	140	3	56.9	22.9	79.8	20	60	400	265	..	2	6	4	0.3	0.1	.45	.53
239	" " "	3.0	..	..	140	2	70.4	12.3	82.7	15	60	360	245	..	2	4	3	0.2	0.7	.33	.42
228	Rice straw, bright, sound (Ark.?) (1943)	6.0	1.5	..	140	5	73.6	13.7	87.3	28	60	400	305	34	42	20	18	3.5	3.9	.46	.49
229	Rice straw, weathered (Ark.?) (1941)	6.0	1.5	..	140	5	70.4	16.9	87.3	15	45	400	280	29	37	21	19	3.3	3.5	.41	.48
266	Barley straw, bright, sound (Nebr.) (1942)	6.5	1.0	..	135	7	67.0	15.4	82.4	45	45	400	400	40	40	16	16	4.9	4.9	.55	.55
267	" " "	4.5	0.85	..	135	7	65.7	19.0	84.7	52	75	400	335	38	40	17	19	4.6	4.9	.50	.55
268	" " "	6.0	1.5	..	140	5	65.1	14.1	79.2	27	60	400	325	36	41	20	19	4.4	4.7	.52	.63
261	Soybean stalks, combined (Ill.) (1942) [6]	8.0	..	Na_2CO_3 9.0	140	5	72.1	18.1	90.2	4	75	400	180	10	20	24	14	1.7	2.8	.34	.61
262	" " "	6.0	6.0	..	140	5	64.8	14.7	79.5	7	75	400	180	11	21	26	15	2.0	3.1	.34	.50
263	" " "	6.0	..	Na_2CO_3 6.0	140	5	73.7	10.3	84.0	8	30	400	245	12	17	25	20	2.1	2.3	.44	.46
264	" " "	6.0	4.0	..	140	5	68.7	11.4	80.1	5	75	400	180	11	23	29	16	2.0	3.3	.37	.62
256	Sugarcane bagasse (La.) (1940)	6.0	1.5	..	140	5	77.6	9.4	87.0	28	50	400	245	32	38	20	18	4.1	4.0	.51	.57
257	" " "	4.0	2.5	..	140	5	77.1	10.9	88.0	30	50	400	260	34	40	18	16	3.9	4.7	.52	.58
258	" " "	8.0	2.5	..	140	5	77.4	11.1	88.5	28	50	400	225	33	37	18	16	4.1	4.4	.51	.61
231	Hemp hurds (Wis.) (1942)	2.0	3.0	..	140	5	79.8	16.4	96.2	36	60	400	280	33	36	19	18	4.2	4.6	.57	.65
233	" " "	8.0	..	Na_2CO_3 9.0	140	5	71.2	15.7	86.9	52	60	400	355	40	43	20	19	5.2	5.3	.61	.63
232	Flax shives (Minn.) (1942)	8.0	..	Na_2CO_3 9.0	140	5	64.1	14.5	78.6	28	75	400	260	5	14	12	13	1.1	2.7	.37	.46
220	Sedge grass (Wis.) (1943)	6.0	1.5	..	140	5	...	...	73.0	..	..	...	...	..	..	..	..	..	..	..	..
221	" " "	..	6.0	..	140	5	...	...	61.7	..	..	...	...	..	..	..	..	..	..	..	..
284	" " "	..	10.0	..	140	5	47.2	7.0	54.3	57	90	400	255	86	89	29	23	7.3	7.4	.70	.78

[1] Basis moisture-free raw material.
[2] Includes cooking chemicals removed from pulp in washer-beater.
[3] Average of five sheets.
[4] Strip 4 in. long, 15 mm. wide.
[5] Total solids by filtration and drying.
[6] Chopped in ensilage cutter before cooking.

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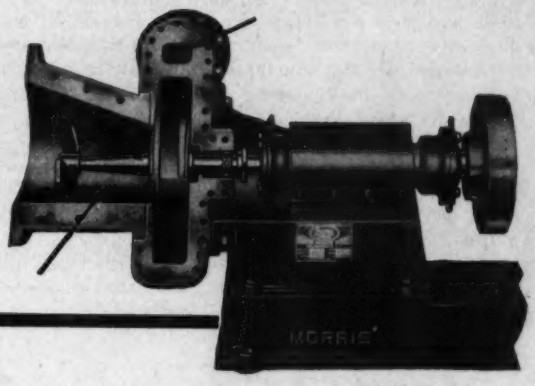

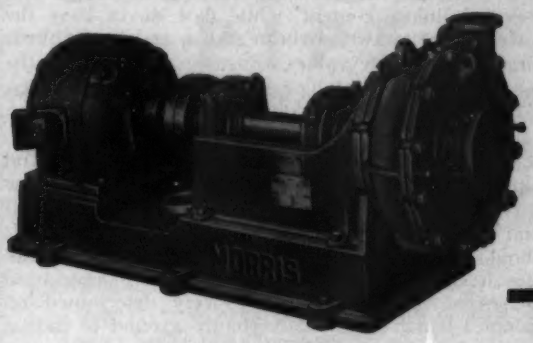

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CENTRIFUGAL PUMPS

proximately 28% pentosans, while rice straw and the other agricultural residues contain 23 to 25% of this constituent. The lower pentosan contents of the latter group might partly explain the relative softness and weakness of the corrugating papers produced from these materials as compared with the stiffer, stronger papers from wheat and the other high-pentosan straws. The flax shives, hemp hurds, and sedge grass have the highest lignin contents, and barley and rice straws, the lowest, while the wheat straw, bagasse, and soybean stalks fall into an intermediate group, containing about 20% lignin. Of the sound raw materials, bagasse has the highest Cross and Bevan cellulose content, while flax shives have the lowest. The straws, soybean stalks, and hemp hurds show intermediate values. Bagasse also contains the largest amount of alpha-cellulose, and rice straw has less of this constituent than any of the other materials analyzed.

The relatively low Cross and Bevan cellulose and alpha-cellulose contents of the South Dakota straw was probably because of the large amount of chaff and impurities found in this threshed straw. It should be noted that all of these values for Cross and Bevan cellulose and alpha-cellulose may have been somewhat low, because they were determined on samples which were inadvertently ground to pass a screen with 1-mm. round holes. These samples, therefore, had a relatively large proportion of fines. The cereal straws had more ash, in general, than any of the other materials tested, and they showed greater solubility in 1% NaOH solution and in hot water.

The adverse effects of weathering upon the composition of straw are shown very definitely by these data. The ash content, hot water- and 1% NaOH-solubility, and lignin content increased with the apparent degree of weathering, while the pentosan, Cross and Bevan cellulose, and alpha-cellulose contents decreased under the same conditions. While these changes would appear to be normal from a qualitative standpoint, their magnitude was unexpectedly large. Weathering apparently causes a considerable loss of papermaking material from the straw as is evidenced by the halving of the pentosan, Cross and Bevan cellulose, and alpha-cellulose contents and by the consequent doubling of the ash and lignin contents. As will be shown later, cooking of weathered straw resulted in low yields of decidedly inferior pulps.

Figures 1 and 2 show the effect of weathering on the appearance of the baled straw. The protective effect of a cover for a straw rick is shown clearly in Fig. 3. The deterioration of a rice straw rick due to weathering is illustrated in Fig. 4.

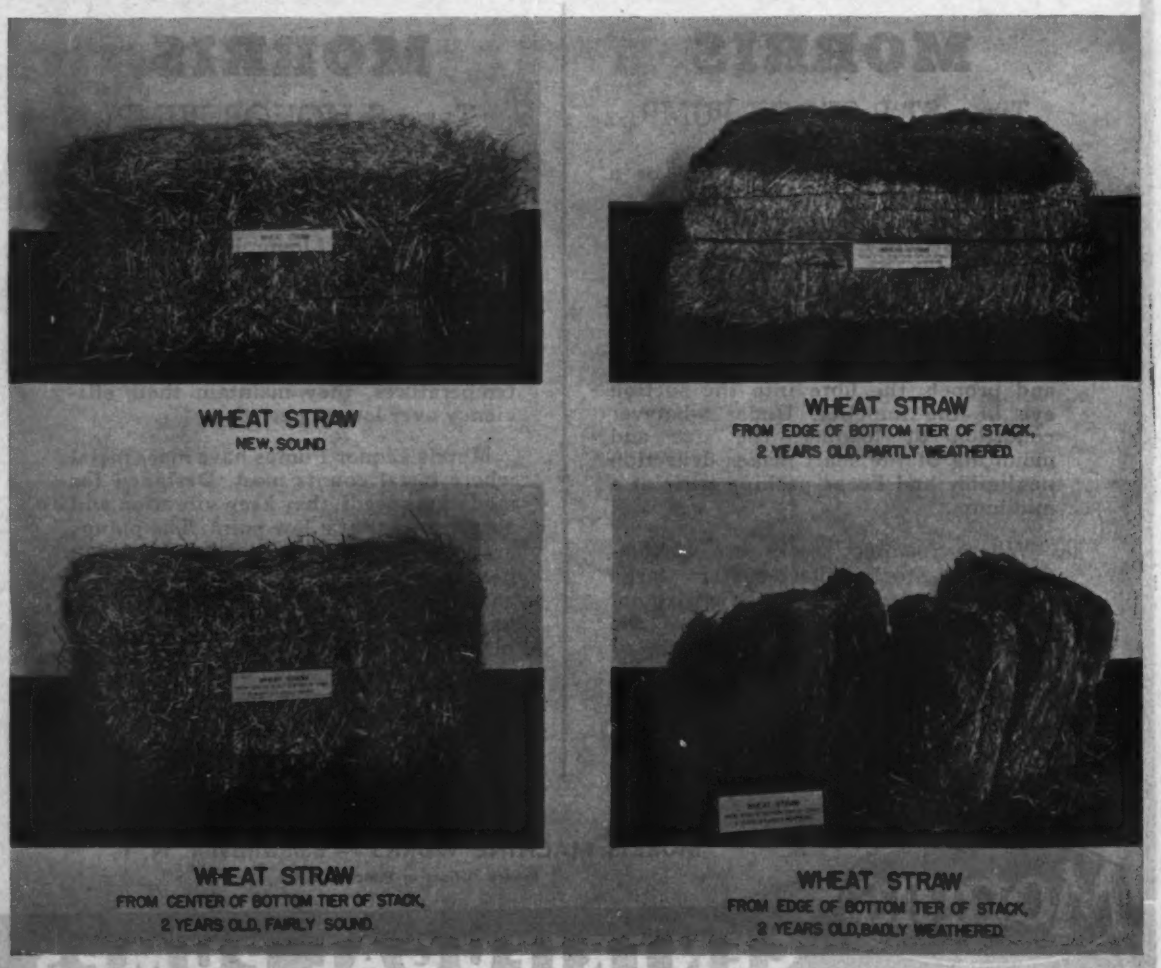
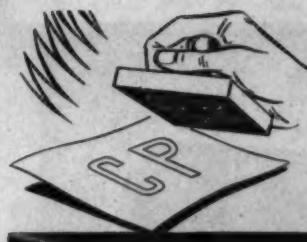

WHEAT STRAW
NEW, SOUND
WHEAT STRAW
FROM EDGE OF BOTTOM TIER OF STACK,
2 YEARS OLD, PARTLY WEATHERED
WHEAT STRAW
FROM CENTER OF BOTTOM TIER OF STACK,
2 YEARS OLD, FAIRLY SOUND
WHEAT STRAW
FROM EDGE OF BOTTOM TIER OF STACK,
2 YEARS OLD, BADLY WEATHERED

FIG. 1
Sound and Weathered Bales of Wheat Straw



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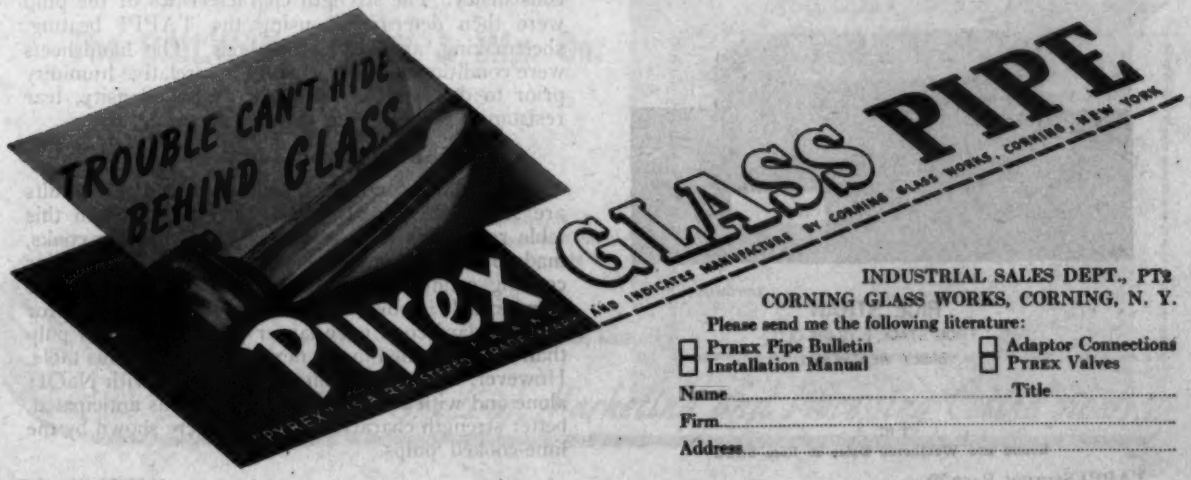

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Pulping and Testing Procedure

The agricultural residues were cooked in a 12-gallon, steam-jacketed, cylindrical, tumbling, stainless steel autoclave, rotating at 1 r.p.m. The autoclave was charged with the raw material, chemical, and water, and the charges were cooked for definite periods at the various temperatures which were generally attained in 15 minutes after steam was turned on. At the end of the cooking period, the pressure in the autoclave was relieved through a condenser in 15 to 25 minutes, after which the liquor was drained from the autoclave through a muslin bag (to recover any fines, straw, or pulp removed with the liquor). The autoclave was then refilled with warm water, and again drained after several minutes. The cooked material was then discharged into a stainless steel container, covered with water, and allowed to stand overnight.

The water was drained from the cooked residue and the latter, along with the material from the muslin bag, was fed into a 12.5-pound washer-beater with approximately 200 pounds of fresh water. (The washer roll was covered with an 80-mesh wire cloth.) After preliminary disintegration of the stock using a clearance of more than 0.010 inch between the beater roll and bed-plate to obtain good circulation, the clearance was reduced to 0.003 inch for a 10-minute period to defiber the stock. The beater roll

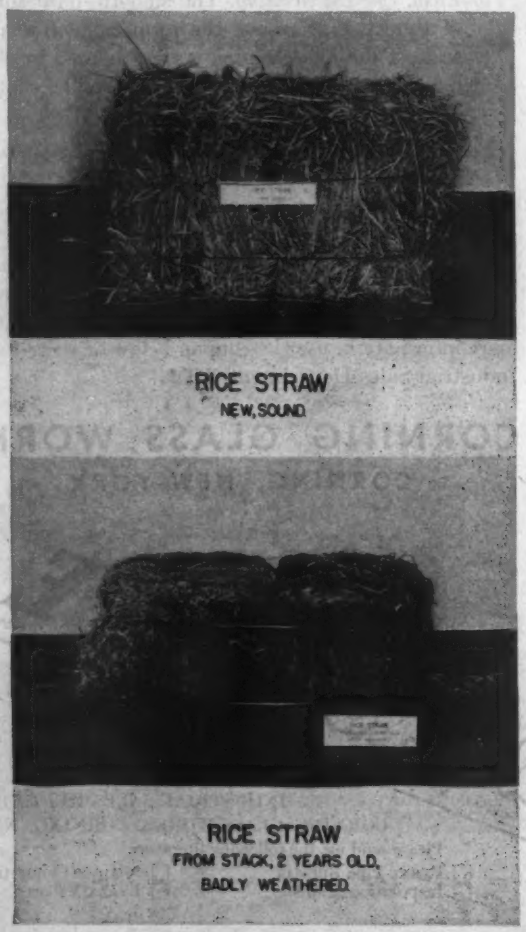

FIG. 2
Sound and Weathered Bales of Rice Straw

FIG. 3
Square-Bale Rick (Wheat Straw) after Being Covered with a Tarpaulin to about One-Third of the Distance from the Bottom. Note the Difference in Color of the Covered and Uncovered Portions. The Streaks in the Upper Portion Are Due to Tears in the Tarpaulin.

FIG. 4
Rice Straw Rick with Crumpled Corner. Note Bulge in the Lower Left-Hand Corner of Rick, Which Is About to Fall Out and Cause Crumpling of the Rick.

was then raised to a clearance of about 0.010 inch, and the stock was washed with approximately 200 pounds of water. The recovered wash water was weighed and analyzed for total solids. The yield of washed pulp was obtained by making an approximately 2% suspension and then determining the actual consistency. The strength characteristics of the pulp were then determined, using the TAPPI beating, sheetmaking, and testing methods. The handsheets were conditioned at 70°F. and 50% relative humidity prior to determining the basis weight, density, tear resistance, and bursting and tensile strengths.

Results and Discussion

The cooking conditions, yield data, and test results are summarized in Table II. The first line in this table represents the average results from six cooks, made on sound combined wheat straw under similar cooking conditions, to provide a tentative reference standard. It is obvious that the conditions chosen for this standard cook gave larger yields of washed pulp than were obtained in the next five cooks in this table. However, the pulps obtained on cooking with NaOH alone and with NaOH plus Na_2S had, as anticipated, better strength characteristics than were shown by the lime-cooked pulps.

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The threshed, sound Illinois wheat straw gave a somewhat lower yield of washed pulp than was obtained from combined straw, but the strength properties of the two pulps were similar. This threshed straw was exceptionally free from dirt and weeds, and although it contained considerably more chaff and fines than combined straw, it had only slightly less culm material (53%) than was present in the combined straw (57%). The sample of South Dakota threshed straw (hard, red spring wheat), however, contained 10% weeds and dirt and an exceptionally large amount of chaff and fines (40%). The low yields and strength properties of the washed pulps from the South Dakota straw are, therefore, quite in order. It is quite possible, of course, that the low pulp yields from this straw may have been partly caused by the nature of the straw itself, which may be quite different in physical structure, composition, and type and size of fiber from winter wheat straw. A comprehensive study of these properties of various straws and other residues is in progress at this Laboratory.

The deterioration of wheat straw because of weathering is evidenced directly by the pulp yields and by the strength characteristics of these pulps. The badly weathered straw (cooks 226, 235, 239) was practically useless as a source of pulp, and its use in admixture with sound straw for pulping would only lower the value of the latter material. On the other hand the slightly-weathered wheat straw (see Fig. 1) gave results practically identical with those obtained from sound straw, indicating that this material had suffered little or no decomposition during storage for 2 years in a protected location.

A fairly good correlation is shown between the pulp yields from weathered wheat straw and its lignin content and solubility in hot water and in 1% NaOH solution (Table I). The solubility in 1% NaOH gave the best correlation, showing inverse proportionality to the pulp yields, i.e., the factor, pulp yield × alkali solubility for the weathered straws was 39, 41, and 42, with an average of about 41. It must be noted that this relationship may hold only for wheat straw under the cooking conditions used here, but it also indicates the possibility of using the alkali solubility of a straw to determine its relative degree of weathering.

Rice Straw

Sound rice straw gave practically the same yields of total and washed pulps that were obtained from wheat straw, but the rice straw pulp had lower strength properties, especially bursting strength. The weathered rice straw yielded less washed pulp with still lower bursting strength, but the decrease was not so large as was expected from a visual examination of the straw. Checking with the analytical data on these rice straws shows that their solubility in 1% NaOH and their other characteristics were similar.

Barley Straw

Barley straw gave lower yields of pulp, which was weaker than wheat straw pulp but somewhat stronger than the rice straw product. It is evident that barley straw must be cooked under milder conditions than either wheat or rice straw. The barley straw pulp tended to hydrate more easily, with a consequent decrease in drainage rate.

As shown in Table II, soybean stalks required considerably more chemical to yield a product which could be defibered by beating. The pulp was weaker than any of the straw pulps tested. The variation in amount and type of chemical used with the soybean stalks caused differences in yield but little or no change in the strength properties of the pulp produced. The relative shortness of the soybean stalk fiber may be largely responsible for the lack of strength in the pulp.

Bagasse

The sugarcane bagasse gave somewhat larger yields of washed pulp than were obtained from wheat straw under similar pulping conditions. The bagasse pulps were weaker, however, and resembled the rice and barley straw pulps in strength characteristics. The indicated variation in amount of chemical used seemed to have no particular effect on the yields and properties of the pulps. It should be noted that the cooked bagasse seemed to be raw when compared with the straw pulps, and it required more time for disintegration in the beater.

Hemp Hurds and Flax Shives

Hemp hurds and flax shives were similar to soybean stalks in requiring considerably more chemicals for pulping. It may be noted, however, that while the hemp hurd pulp had strength properties similar to those of the straw and bagasse pulps, the flax shive pulp was by far the weakest of any of the pulps tested. The sedge or "wool" grass was not softened sufficiently by the lime-caustic treatment used to allow it to be defibered in a beater. Larger amounts of alkali gave a relatively low yield of pulp with fair strength characteristics. The sedge fiber appeared to be somewhat shorter than wheat straw fiber.

Summary and Conclusions

It is apparent from the preliminary work described that wheat straw, particularly from the soft winter wheat of the mid-Central states, was the best of the raw materials examined for the production of corrugating paper or board pulp. Combined straw yielded somewhat more pulp than did threshed straw. It is shown clearly that weathering of straw has a very deleterious effect on the yield and properties of the resulting pulp.

Rice straw, barley straw, sugarcane bagasse, and hemp hurds fall into a group giving similar or somewhat lower yields of pulp than were obtained from sound wheat straw. The strength properties of the pulps from this group, however, were definitely lower than those of the wheat straw pulp produced under similar conditions of cooking and stock preparation. Hemp hurds required considerably more drastic cooking than the other materials in this group.

Pulp yields from soybean stalks were comparable to those obtained from the cereal straws, but considerably more cooking chemicals were required, and the pulps were much weaker. Under the conditions described in this report, flax shives gave low yields of quite weak pulp.

These results indicate that agricultural residues other than wheat straw can be used in the manufacture of corrugating or board pulps, but that none of them equal wheat straw for producing a comparable yield of strong pulp. However, as corroborated by recent mill experience, in periods of shortage they can be blended with wheat straw pulps to extend the latter without too large a sacrifice in desirable properties of the final products.

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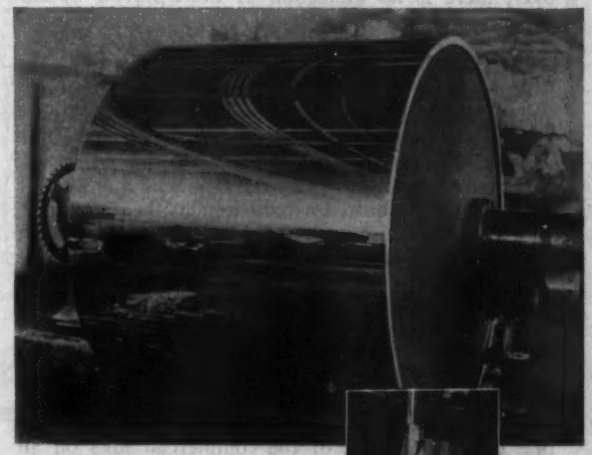

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A Modified Pen and Ink Sizing Test*

By B. W. Smith[1]

Abstract

A simple, economical and rapid method of size testing has been developed for use where feathering of ink is the main consideration. It involves the application of inks of varying characteristics. Reasons are given for using this method with a brief history of the causes for its development.

It is well known that various published and accepted tests for sizing, in which permeability to water is measured, do not run parallel with tests made with writing ink; the principal objection to insufficient sizing being feathering of the ink. There are a number of tests more or less in general use such as, flotation, drop, and actual application of an ink with a pen that indicate the nature of sizing but are not necessarily measures of feathering. In all of these a standard ink is used but, unfortunately, very few inks are similar to the standard and the results are difficult to interpret in terms of feathering. They are reported as sufficient and insufficient sizing and no numerical grading is practical to observe deterioration over a period of time or for other reasons. Moreover, there is no indication of the behavior of the paper with other inks.

Development of Writing Inks

At one time all writing inks contained gum arabic and generally a preservative of some sort and only a very poor degree of sizing was indicated by the simple and most universal test, application of an ink to paper with a pen. The development and use of fountain pens required a reduction in the amount of gum arabic because it clogged the feeding mechanism by drying so that the gum has been decreased gradually until now very few writing inks contain this material. The continued use of fountain pens and the desire to have them start immediately introduced surface active compounds and hygroscopic agents into the formulas. Consequently the pen tests for degree of sizing should use some standard ink that contains these reagents and produces feathering similar to that caused by some of the commercial inks on all but fully sized paper. As long as that ink is used such a test should be satisfactory but if for various reasons the user shifts to another variety of ink it might be found that the results are not satisfactory. From the users' viewpoint the paper is then at fault and not the ink. Stationery and paper processors, who use writing papers in their products, have had frequent occasion to make such adjustments because a paper was unsatisfactory for a certain ink, although it had been tested and found to be correct with another ink. This clearly creates a need for a standard test to protect the papermaker, the paper dealer, and any printer or processor—to say nothing of giving satisfaction to the customer.

A concrete example of what can happen with this method of testing was illustrated a few years back when there was an epidemic of complaints of ink feathering on writing paper. This was coincident with the introduction of a new and well advertised ink that was designed apparently to be used with a newly introduced fountain pen. A critical examination of this particular ink indicated the presence of carbitol (diethylene glycol diethyl ether). Soon this ink had a number of competitors so an examination was made of all inks that were available at that time and it was found that they could be classified as to the general nature of the component that augmented feathering. A well-known red ink was eosine in solution with tribasic sodium phosphate; an equally well known green contained phenol; and another, a small percentage of diethylene glycol. Some of the lesser-known inks were bolstered in their wetting properties with those surface active materials, while others contained none at all. In no case did any of the inks that gave trouble have any surface active material that differed in its characteristics from those just outlined.

Test Inks

It was then decided to make up three standard inks that would approximate the behavior of those very active in feathering, along with an ink made by the formula given in the TAPPI Standard T 431-m. A more or less empirical formula was adopted and the active material made in two strengths. These were matched to the commercial inks in their feathering characteristics with a standard grade of paper. A set of inks was also made containing double the active material and another with none but with the same quantity of colored matter. Intermediate grades could be made to give a numerical approximation which would be advantageous in determining deterioration of sizing with time or for other causes.

As a guide to those who wish to develop this method of testing to greater precision the formulas are given below:

Red	—	Eosine	1.5 grams
		1% water solution of tri-basic sodium phosphate	4.50 ml.
Green	—	Wool green	1.5 grams
		1% solution of phenol in water	450 ml.
Blue	—	Acid Violet 12 B	1.5 grams
		2% solution diethylene glycol in water	450 ml.
Black	—	Formula given in TAPPI Standard T 431-m.	

Mixtures of any ink can be made with and without a surface active material at any desired percentage. It will be found that 1% requires a critical degree of sizing to avoid overdoing it and 0.5% is a desirable middle ground. It would seem advisable, in order to make a study of sizing to prevent feathering, to have solutions containing 0.25, 0.5, 0.75 and 1.0% of reagent and a set of colored inks with no surface active material, the latter to determine a degree of sizing so frequently met where it is difficult to write on the paper because of its repelling action. Without the surface active material the plain dye solution would indicate that very quickly. All colors should be applied in the test to determine that feature, for the dyes, being sodium salts or complex sulphonic acids, have some slight surface activity of themselves.

In actual practice it has been found that paper which does not feather with all three inks that con-

*To be presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 19-22, 1945.

[1] Director of Research, The Todd Co., Inc., Rochester, N. Y.

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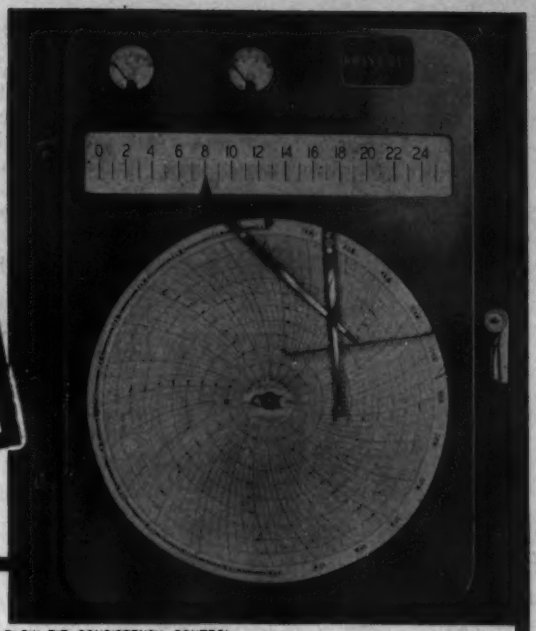

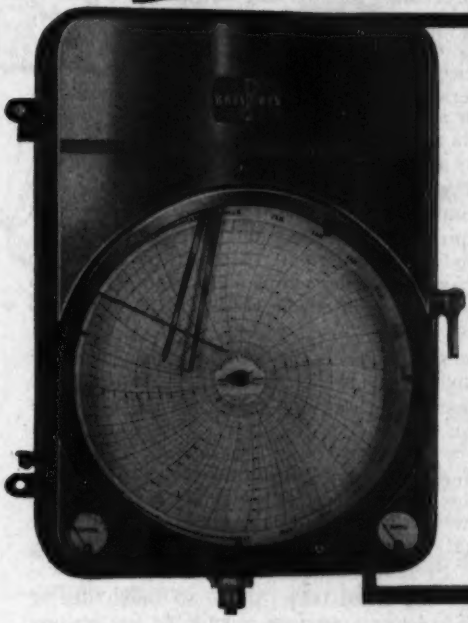

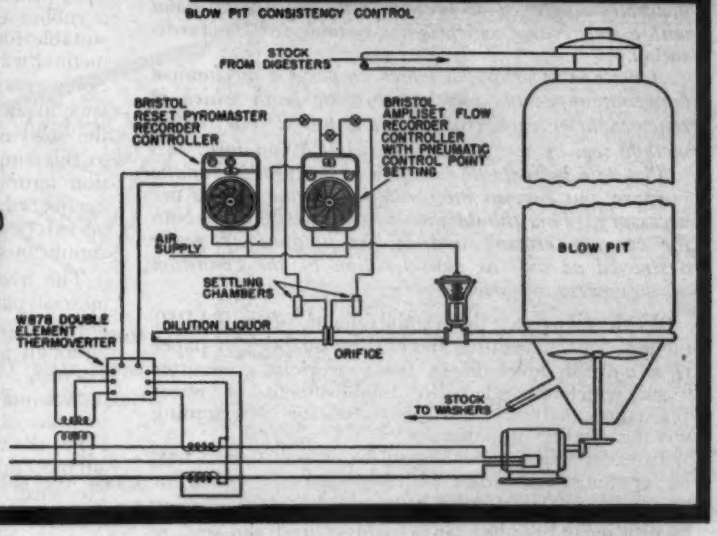

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tain 0.5% of active material is universally satisfactory, but papers that feather with one or more of these inks can be depended upon to bring forth with broad distribution at least a few complaints. The standard black, without any surface active material is retained for comparison and where it is explicitly specified in specifications. The method is crude and empirical but it has the nucleus of a more refined and informative method of testing for this important feature.

Generally the results are independent of the pen point that is used, although a ball pointed pen is indicated for scratches made with sharp points give false indications at times. The mark should be heavy at 45° to the grain of the paper and then crossed at right angles to itself. Generally it should not be blotted but allowed to dry. Atmospheric conditions do have an effect on the final results, but not as serious as one would believe, except when the test is made to determine oversizing with the inks without any surface active components other than the dye itself.

Determination of the Erasing Qualities of Paper*

By Philip W. Codwise[1]

Abstract

There is no accepted standard method available for testing the erasing qualities of paper. The method generally employed at present is an erasure by hand with a steel eraser which is not suitable for standardization.

A method is proposed which employs a mechanical abrading apparatus and an abrasive cloth which is renewed after each erasure. It is hoped that such a method will be acceptable as a TAPPI Standard.

The data indicate this method to be suitable for the purpose, but careful interpretation of the results are necessary. This should involve consideration of both the ease of erasure and of the amount of paper destroyed as well as consideration of the condition of the erased surface.

Work aimed at the establishment of a TAPPI method for determining the erasing qualities of paper is a natural development from previous committee work which included the establishment of water resistance methods and of those for determining writing quality of papers.

In order that a paper should be erased it must first be written upon, either with pen and ink, pencil, or typewriter. Therefore the determination of erasing quality in its broadest sense involves first, the erasure of characters made with water vehicle inks, and second of those made with solid or semisolid materials, generally of an oily nature. The present investigation has confined itself to pen and ink writing. At a later date the remaining phase will be investigated; this involves the relations of oils and solid materials to paper surfaces and requires more detailed study.

When a sheet of paper has been written upon and the ink allowed to dry, the ease with which it erases and can be rewritten upon resolves itself into a number of phases all of which must be considered. These involve the character and writing quality of the original surface upon which the marks are made. The questions then are as to how easily can these marks be removed and how much is the paper surface damaged in the process. After this, it is a question of how well can the paper be rewritten upon and how many times can the process be repeated.

The object of this article is to point out a possible standard procedure for carrying out the above and to present some results of tests upon representative papers.

In practice, erasing is generally done with a steel or a rubber eraser, neither of which seemed eminently suitable for a control test. For this reason the present method was developed which gives comparable results. Some years ago the writer had quite extensive experience in the testing and control of erasure quality with the steel erasure and all results have been referred to this empirical method in which the personal equation figures to some extent. Also other committee members have tested the samples and it therefore can be safely assumed that these results are of practical significance.

The five specimens in the tabulation are all commercial papers of satisfactory quality and therefore do not present any striking variations in properties although an analysis of the data shows it to be of interest.

When one writes upon a sheet of paper and attempts to erase the same, a variety of things may happen. First, the writing may have penetrated so far into the surface that it cannot be erased without destroying the sheet. Second, assuming that the writing was satisfactory, the sheet may "fluff" so much during erasure as to leave a surface unsuitable for writing upon. Third, assuming the first writing and erasure to be satisfactory the sheet may spread ink or feather when rewritten upon. It is believed that the foregoing describes the erasure problem for pen and ink writing in a few words, but it might be added that when oily typing, or pencil writing is considered, smearing of the figures also enters the picture.

In order to investigate the factors entering into pen and ink erasure the following work has been done by the subcommittee and is reported upon herewith.

Probably the most important single feature has been to obtain a suitable mechanical method of erasing the sheet. An abrading machine having a carefully controlled rubbing action was necessary and for this purpose the one developed by the Howard Smith Paper Mills as shown in Fig. 1 was used. The essentials of such a machine are (1) a uniformly moving and controlled abrading part, (2) a clamping part to hold specimen in proper relation to the abrading action and (3) mechanical means for performing the erasing. This has been done by fastening all parts firmly to a single base and operating them with an

* Presented by title at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Hotel Commodore, New York, N. Y., Feb. 19-22, 1945.

[1] Member TAPPI; Chemical Engineer, Beaver Wood Fiber Co., Ltd., Thorold, Ont.

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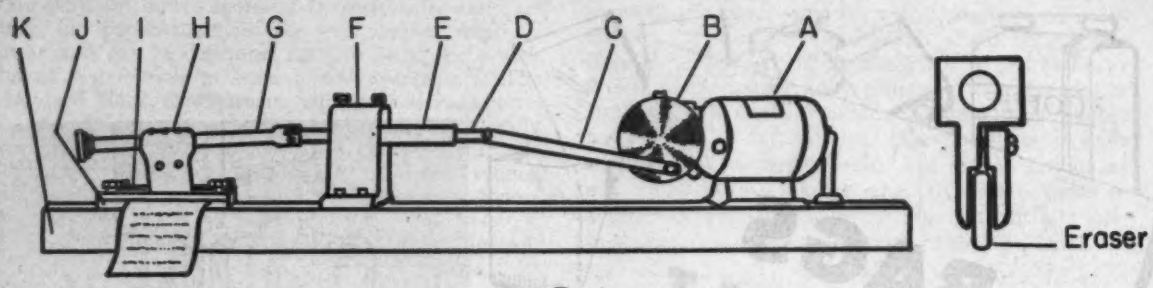

FIG. 1

Diagram of Erasure Apparatus with Detail of Eraser Holder. A. Motor—C.R. 3 Type, with Gear Ratio—144.5 to 1. B. Fly Wheel—Brass 3.25 in. Dia.—0.375 in. Thick with Eccentric Arm 1 in. from Center of Wheel. C. Eccentric Arm—8 in. Long—0.5 x 0.375 in. Steel Bar. D. Piston Rod—0.5 in. Steel Rod—8.375 in. Long. E. Piston Sleeve—0.5 in. Inside Dia. Brass Tubing—5.25 in. Long. F. Piston Support—1.75 in. Brass Bushing. G. Eraser Arm—0.625 x 0.625 Brass Rod—6.5 in. Long. H. Eraser Holder—Brass Plate—0.375 x 1.25 x 1.5 in. I. Paper Clamps—2 Brass Bars—4.75 x 0.5 x 0.1875 in. with Thumb Screws. J. Eraser Bed—Steel Plate—3 in. Dia.—0.25 in. Thick. K. Base—Wood—36 x 7 x 1 in.

electric motor. Any other instrument having the required characteristics would serve as well. However, the severity of the erasure must be carefully controlled as will now be developed.

The machine rubs the specimen's surface gently and uniformly at a speed of 120 single strokes per minute and the preliminary problem was to develop strictly reproducible test conditions which duplicate average erasure as done by steel or rubber erasers. It appears to be difficult to standardize conditions with a steel eraser, and rubber erasers lack the required permanency for a standard method. This problem is believed to have been solved by using a suitable quality of abrasive cloth as the abrading medium and backing it up with a rubber of definite density.

Earlier investigations showed that 2/o Diamond Grit emery cloth (Lot J 3) of Canada Sandpapers Limited was ideally suited for the purpose and the tabulated results in Tables I and II are based upon the work with this grade. Later investigations showed that there is a certain amount of difference in 2/o emery cloth from various sources and other types of abrasive cloth were tested out. A comparison of types found suitable is given in Table III.

It will be noted that 150 to 180 grit abrasive cloth corresponds closely to the 2/o emery cloth used in the original tests, and as these are more closely standardized grades such would be preferable in a standard method. It will be noted that 150 grit Durexite cloth made by the Canadian Durex Company is suitable, as is the 180 J silicon carbide cloth of the Carborundum Company in the United States. It was found that the very fine grit abrasive cloths which are generally used for polishing had a similar action on these papers and for this reason were not suitable. In contrast, the action of the coarser grades of abrasive cloths proved to be too severe for carefully controlled work.

Experiments were also conducted employing different degrees of pressure during the erasing process, and it was found that the machine as originally designed was most suitable for the purpose. This has a total weight of head of 327 grams. With double the weight, the samples tended to fuzz and to smear to a greater degree than was reasonable. After extensive trials it was found that the above combination of pressure and of abrasive cloth was most suitable.

Development of Testing Procedure

The question then arose as to how the tests were to be conducted to obtain the most representative results. The factors involved were:—

1. The writing quality of the paper surface; in other words the ink spread and the ink penetration.
2. The perfection of the paper surface, that is its smoothness and freedom from fuzz.
3. The amount of the paper destroyed during the erasure process.
4. The tendency of the paper to fuzz during the erasing.
5. The tendency of the ink to resist erasure and possibly to smear.
6. How much effort and time is required for the erasure process?

In other words, how quickly can the sheet be erased and how efficiently can it be done from a standpoint of fluffing and of rewriting.

TABLE I.—DETAILED TEST RESULTS—2/0 EMERY CLOTH—SINGLE STROKES TO ERASE

Sample No.	Kind of Paper		First Erasure	Second Erasure	Third Erasure	Fourth Erasure	Fifth Erasure	Sixth Erasure	Seventh Erasure	Eighth Erasure	Ninth Erasure	Average Erasure
1	Rag ledger	Wire side—with grain	51	62	58	63	69	72	79	60	Through	
		Wire side—cross grain	69	65	80	61	55	68	79	62	the	
		Opposite side—with grain	55	82	67	88	67	60	74	48	sheet	
		Opposite side—cross grain	70	73	68	72	68	63	80	60		
		Average	61.25	70.50	68.25	71.00	64.75	65.75	78.00	57.50		67.13
2	Rag content ledger	Wire side—with grain	33	35	53	38	Through					
		Wire side—cross grain	31	37	37	49	the					
		Opposite side—with grain	33	41	52	36	sheet					
		Opposite side—cross grain	31	37	40	48						
		Average	32.00	37.50	45.50	42.75						39.69
3	Sulphite ledger	Wire side—with grain	24	30	32	35	41	Through				
		Wire side—cross grain	26	30	29	39	42	the				
		Opposite side—with grain	27	26	29	33	41	sheet				
		Opposite side—cross grain	27	32	29	38	39					
		Average	26.00	29.50	29.75	36.25	40.75					32.45
4	Rag content bond	Wire side—with grain	39	40	37	33	Through					
		Wire side—cross grain	44	42	42	35	the					
		Opposite side—with grain	47	43	50	34	sheet					
		Opposite side—cross grain	32	33	35	32						
		Average	40.50	39.50	41.00	33.50						38.63
5	Rag content stationery	Wire side—with grain	32	34	48	Through						
		Wire side—cross grain	20	22	48	the						
		Opposite side—with grain	26	40	38	sheet						
		Opposite side—cross grain	19	34	48							
		Average	24.25	32.50	45.50							34.08

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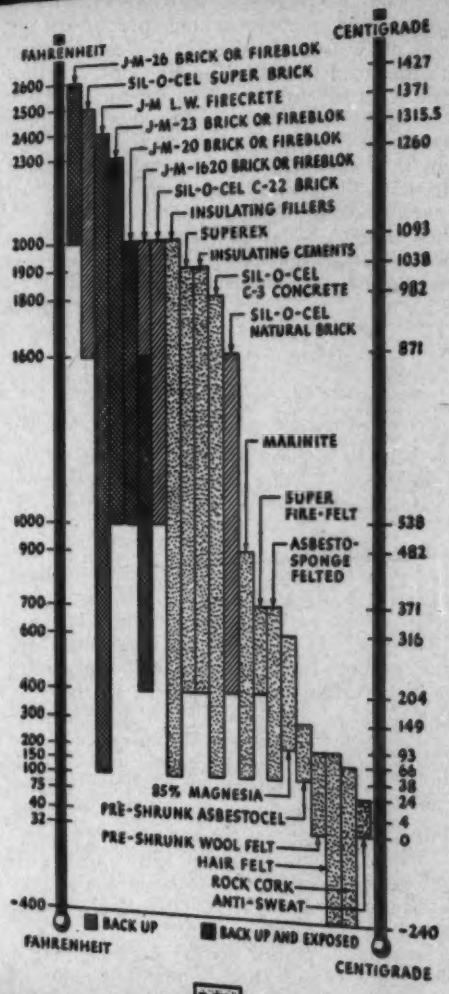

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In order to standardize the method the work was confined to standard writing ink and a cross hatched pattern (|—|—|—|—|—|—|) applied with a ruling pen at a definite setting was adopted; the writing being allowed to thoroughly dry before erasing. The process is then repeated as many times as possible.

Procedure

Cut a small piece (1.5 by 1.25 inch) of suitable 2/o emery cloth or equivalent with the grain the short dimension, fold it around one of the long narrow edges of a rectangular piece of Faber No. 112 rubber eraser, or equivalent rubber backing, previously cut to size, to fit the erasure head. Fit this combination into the erasure head with the abrasive cloth surface exposed, taking great care not to crack the abrasive face, as a crack tends to leave a sharp edge which would cut through the paper.

Determine the exact caliper of the specimens to be tested and cut to the proper size to fit into the bed of the erasure machine. Draw upon the specimen a cross-hatched line (|—|—|—|—|—|—|) with a drawing pen set at an opening of 0.0001 inch using standard writing ink of following formula:—

	Grams
Tannic acid	11.7
Gallic acid crystals	3.8
Ferrous sulphate	15.0
Hydrochloric acid dilute U.S.P	12.5
Carbolic acid (phenol)	1.0
Soluble blue (Shultz No. 539; C.I. 707)	3.5

Water to make a volume of 1,000 ml. at 20° C. (68° F.)
Made according to directions found in TAPPI Standard T 431 m-41.

The pen is held in a perpendicular position to the surface of the paper and just enough pressure is used to draw a satisfactory line without indenting the paper.

Successful conduct of the test depends upon the proper relation of the paper and abrasive medium during the erasing process. To accomplish this, lower the erasure head with the abrasive cloth and backing loosely in place upon the rubber bed prior to inserting the specimen and hold firmly in place while tightening the screw which is designed to hold it in position.

Allow the specimen to thoroughly dry, which is generally complete in 5 minutes, and then place in the erasure machine upon the rubber apron cloth $\frac{1}{16}$ inch thick which is used to support all samples. Lower the erasure head upon the specimen which is carefully smoothed out. Firmly tighten the screws to hold the two parallel bars upon the specimen with a firm grip and prevent any possibility of wrinkling as well as to keep the specimen flat and in perfect alignment during the progress of the test.

The specimen is so placed in the machine that a single stroke of the erasure head contacts equally all points of the design to be erased. Start the motor and determine the number of single strokes of the head required to completely erase the design. During the progress of the test note the behavior of the surface, and especially its tendency to fuzz.

Upon completion of the first erasure remove the sample from the machine and carefully examine. Rewrite upon the specimen in an identical manner and note the difference in its writing characteristics in detail with especial attention to its tendency to feather. In the meantime remove the abrasive cloth from the machine, discard and insert a new piece in a similar manner, carry out the second erasure in the same manner as the first one, carefully making all observations. Repeat until the specimen has been erased through.

After the last erasure has been completed and all observations made, divide the original caliper of the sheet by the number of erasures made to obtain the average thickness of stock removed per erasure.

Test Specimens

In order to show the results of this erasure test upon commercial products, five papers were selected as follows:—

1. Surface sized, air dried, rag ledger.
2. Surface sized, machine dried, rag content ledger.
3. Surface sized, machine dried, bleached sulphite ledger.
4. Surface sized, air dried, rag content bond.
5. Surface sized, machine dried, rag content stationery.

The samples were all satisfactory commercial products, showing no easily noted deficiencies and would normally be considered difficult to grade for erasing quality. They were carefully tested by the above procedure and the results are found in the accompanying Tables I and II.

Test Results

Before giving the summary of qualities in Table II, in which the factors are worked out, in Table I the detailed data for the various papers are given, done on both the wire and felt side, as well as with and across the grain. It can be easily appreciated that for any one of these four conditions the erasure may be different but, all things considered, the results show good agreement for this type of work.

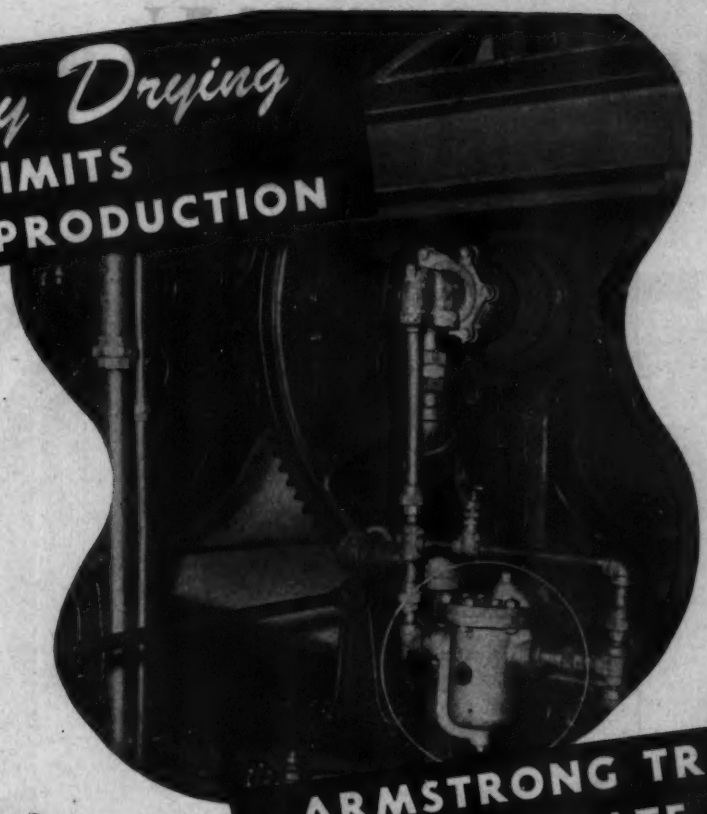
In Table II the results have been summarized for purpose of calculation, the average result for the four different positions of test sheet, being used. In view of the greater practical importance of the first erasure this has been tabulated, followed by the calculated average erasure through the sheet, giving these results in single strokes. Then the resistance to ink spreading and the tendency toward fluffing of the surface of the sheet, both for the original samples and after the first erasure is tabulated, as being of major importance. The original caliper of the sheet and the number of erasures possible before the sheet is rubbed through is then given and these are used in the calculations which follow.

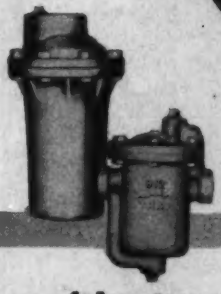
In grading the papers analytically a number of factors must be considered. The various features are all of importance but calculations based upon them are of considerable interest. Therefore, two columns are included, both of which are a measure of the

TABLE II.—SUMMARY OF TEST DATA—3/0 EMERY CLOTH

Sample No.	Kind of Paper	Strokes for First Erasure	Average Strokes Per Erasure	Surface Fluff Original Sample	Surface Fluff After First Erasure	Ink Feathering Original Sample	Ink Feathering After First Erasure	Caliper of Sheet Inch	Number of Erasures Possible	Average Reduction Per Erasure, Inch	Average Reduction Per Stroke, Inch
1	Rag ledger	61.25	67.13	none	very slight	none	none	0.0070	8	0.00088	0.0000131
2	Rag content ledger....	32.00	39.69	none	moderate	none	very slight	0.0045	4	0.00113	0.0000285
3	Sulphite ledger	26.00	32.45	none	very slight	none	none	0.0063	5	0.00126	0.0000388
4	Rag content bond.....	40.50	38.63	none	very slight	none	none	0.0045	4	0.00113	0.0000293
5	Rag content stationery	24.25	34.08	none	moderate	none	none	0.0042	3	0.00140	0.0000411

Faulty Drying LIMITS PAPER PRODUCTION





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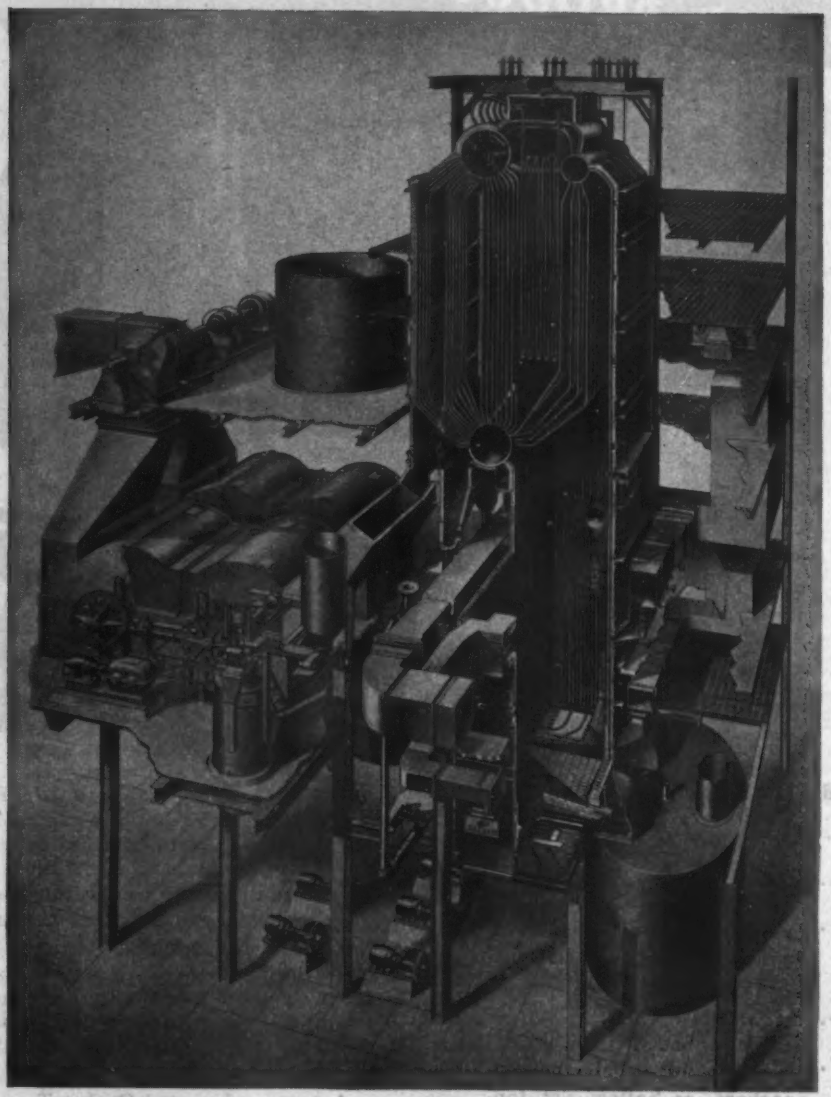

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TO THE PAPER INDUSTRY

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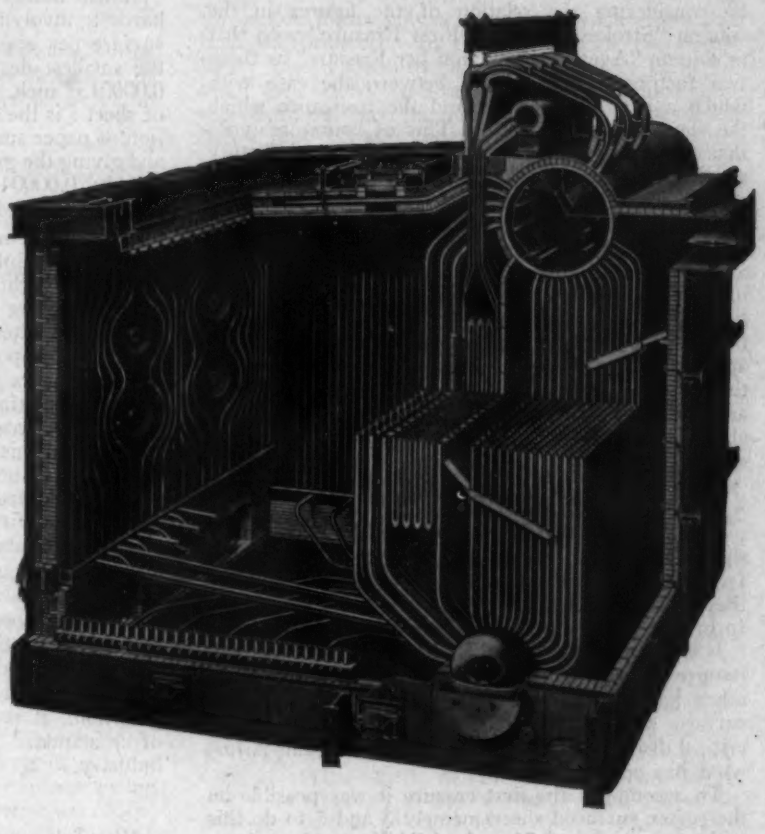

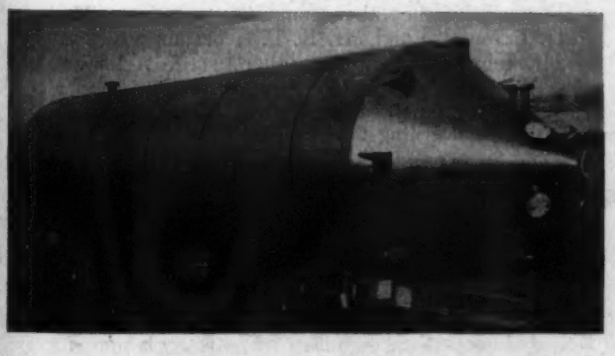

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hardness of the sheet with regard to erasure. The first of these calculated columns is the "Average Reduction Per Erasure," arrived at by dividing the caliper of the sheet by the number of erasures possible. The second calculated column is the "Average Reduction Per Stroke" arrived at by dividing the figures in previous column by the average single strokes required to erase the writing during all tests on the sheet.

It is probable that the best quality gages are obtained by considering the relation of the figures in the column "Strokes to Erase—First Erasure" with that in column "Average Reduction per Erasure" as these two factors give a balance between the ease with which a soft sheet erases and the resistance which the sheet offers to erasure. This of course assumes that the writing qualities of the sheets are satisfactory at all times.

In Table III are shown the relative behavior of three different abrasive cloths which may be considered suitable for this work. When deciding upon a type for standardization, the most readily obtainable in uniform quality should receive greatest consideration. The latter two types appear to be favored in this respect over the usual emery cloth and they both appear to give uniform abrasive results throughout the tests. An analysis of the results indicate these 150 and 180 grit products to be somewhat sharper in abrading quality than is the comparable grade of emery cloth.

Analysis of Results

It is believed that an analysis of these results as shown in Table II agrees with the generally accepted facts regarding the erasure of papers and that possibly they put these facts in a somewhat more concrete form than has been done before.

It is natural to expect that the harder surfaces will require more strokes to erase them but that on the other hand relatively less destruction of the paper surface will occur in the process. The following critical discussion of the results shows that this is just what has occurred.

To accomplish the first erasure it was possible on the softer surfaced sheets namely 3 and 5 to do this with an average of 26 and of 24.25 strokes respectively, whereas with the hardest surfaced sheet 1 an average of 61.25 strokes was required. On the intermediate surfaces 2 and 4, 32 and 40.5 strokes respectively were required. This is of importance from the standpoint of ease of erasing the first writing. It will be noted that while the relation persists in subsequent erasures the differences are not quite as pronounced.

While the ease of erasure is important, the amount of destruction of the paper surface during the erasing process and the character of the resultant writing surface is of fully as great importance; this is brought out well in the table setting forth the reduction per erasure and still more so in the table of reduction per stroke.

It will be noted that the surface of sheet 1 is the hardest, involving the smallest destruction of paper surface per erasure namely 0.00088 inch and giving the smallest destruction of paper per stroke namely 0.0000131 inch. It also will be noted that the surface of sheet 5 is the softest, involving the greatest destruction of paper surface per erasure namely 0.00140 inch and giving the greatest destruction of paper per stroke namely, 0.0000411 inch. The other three sheets fall into an intermediate category in each instance.

There were moderate differences in writing qualities, namely ink spread and fluff after erasure but these were slight upon the first erasure and no striking deviations were found upon subsequent erasures. Of course the matter of ability to rewrite upon the surface is of great importance and in the case of these commercial papers it would be expected that the same would be satisfactory. A defect that may be encountered in this connection is a tendency for the ink to feather and this often depends upon the kind of ink employed. Another defect that may occur is a tendency toward fluffing during erasure which most frequently occurs when the sheet has not been sufficiently penetrated by the surface treatment. In such a case it may give a poor erasure once the surface film has been destroyed.

In this report has been presented a standardized method of testing the erasing qualities of papers. Former methods have been highly empirical and depended too greatly on the personal factor for interpretation. It is hoped that this may form the basis of a standard testing procedure acceptable to the industry.

Acknowledgment

We wish to express our appreciation of the assistance given by the other committee members, Mr. G. H. Lafontaine and Mr. K. P. Geogehan a well as by Mr. John Wilson of the author's staff. Acknowledgment is also made to the Institute of Paper Chemistry for their assistance in connection with definitions concerning the scope of this investigation.

TABLE III.—TESTS ON SAMPLE I—LEDGER—WITH DIFFERENT ABRASIVE CLOTHS—SINGLE STROKES TO ERASE

Kind of Abrading Cloth		First Erasure	Second Erasure	Third Erasure	Fourth Erasure	Fifth Erasure	Sixth Erasure	Seventh Erasure	Eighth Erasure	Ninth Erasure	Average Erasure
2/0 Emery cloth ..... Canada Sand Papers, Ltd.	Wire side—with grain.....	51	62	58	63	69	72	79	60		
	Wire side—cross grain.....	69	65	80	61	55	68	79	62	Through	
	Opposite side—with grain.....	55	82	67	88	67	60	74	48	the	
	Opposite side—cross grain.....	70	73	68	72	68	63	80	60	sheet	
	Average	61.25	70.50	68.25	71.00	64.75	65.75	78.00	57.50		67.13
150 Durexite cloth	Wire side—with grain.....	48	50	58	62	66	64	70			
	Wire side—cross grain.....	46	44	50	58	52	54	59	Through		
	Opposite side—with grain.....	52	51	54	50	48	52	50	the		
	Opposite side—cross grain.....	52	51	54	56	52	54	52	sheet		
	Average	49.50	49.00	54.00	56.50	54.50	56.00	57.75			53.89
180 Silicon carbide cloth	Wire side—with grain.....	48	56	54	60	62	60	62	42(a)		
	Wire side—cross grain.....	48	50	55	61	59	57	60	36(a)		
	Opposite side—with grain.....	57	54	58	60	62	62	60	44(a)		
	Opposite side—cross grain.....	52	54	53	62	58	62	64	44(a)		
	Average	51.25	53.50	55.50	60.75	60.25	60.25	61.50	41.50(a)		59.27

Note (a). In this case writing one half erased when through sheet.

The Use of Pyrodextrins in the Clay Coating of Paper*

By Ralph W. Kerr[1] and Norbert F. Schink[1]

Abstract

The application of starch products in clay coating mixtures is discussed in relation to the suitability of the two molecular species, amylose and amylopectin, found in starch.

It is shown that amylopectin possesses colloidal characteristics which make its use in coatings more desirable than amylose.

Experiments are presented which lend support to the view that dextrinization involves a joining of linear chains (from amylose) with branched structures (from amylopectin) to form a higher proportion of the latter than exists in untreated starch. The use of these pyrodextrins as a superior coating adhesive is indicated.

Pyrodextrins made from corn starch are shown to form concentrated solutions of low viscosity. When these are mixed with clays the coatings have relatively low viscosity, low plasticity, and high adhesive value when a comparison is made with other starch products commonly used in coating mixtures. These characteristics indicate the use of these dextrins not only in low density coatings but also in high density coatings which are used in machine applications.

The advantages to be gained by the use of coatings having a density as high as is permissible when pyrodextrins are used, are pointed out.

Part I—Theoretical Aspects

Kerr *(1, 2)* has discussed the chemistry of the starches with reference to sizing paper. It is assumed that the branched polymer fraction of starch is more suitable for the preparation of clay coatings owing to its greater dispersing effect (protective colloid effect) on clay and to its lesser tendency to increase in viscosity or to gel as the concentration in water is raised. The linear polymer fraction of starch has a negative protective colloid effect on clay in high concentration, tends to set to an irreversible gel and increases the plasticity particularly at the usual operating temperature.

The viscosity of solutions of both polymers are too high and a reduction by chemical modification is required before either is satisfactory in the preparation of clay coatings.

The above assumptions have been shown to be correct by experiments performed in these laboratories. To avoid the complications which may be introduced by chemical modification each corn starch fraction was tested in its unmodified state *(3)*. To obtain workable brush coatings which contained a total solids content of 45%, the ratio of starch polymer to clay was reduced to 5:100. Coatings of this composition which contained the branched polymer fraction were applied at room temperature. The coatings which contained the linear polymer set to a plastic mud and it was found necessary to apply it at 75°C. Under these conditions it was found that the *native* linear polymer had more adhesive value than the branched. In the former case the coated paper gave a Dennison wax test of about 2; in the latter case, 0. At a ratio of 7 parts of branched polymer to 100 of clay, the mixture gave a coating which had a wax test still under 2. However, as the fractions were degraded (by acid) and then separated by fractional precipitation from a water dispersion of an acid hydrolyzed corn starch, it appeared that the linear polymer lost its adhesive value at a greater rate than the branched polymer.

It has been reported *(2)* that in some of the modifications used to reduce the viscosity of starch to a level at which it may be used for sizing purposes, the relative proportions of the two polymers (as they exist in the native starch) do not appear to remain constant. Dextrinization of starch by heat has been noted on occasion to reduce the proportion of the linear polymer. If, however, this reduction signifies a degradation of the fraction by shortening its average chain length, it may be expected that these polysaccharides would possess little sizing value and that the total value of the starch would be reduced. This result is obtained in the production of the common dextrins of commerce for these are manufactured by roasting starch in the presence of highly ionized acid "catalysts" such as hydrochloric acid. The poor results obtained by the use of these dextrins in clay coating applications is understandable. As the starch is modified, the product from the early stages of the reaction produces a coating which is too high in viscosity and plasticity to be useable. As the modification of the starch continues, a level is reached where the viscosity of the coating is satisfactory, the adhesive value is passable for certain types of coated paper, but the plasticity is high. Further modification of the starch gives a product which produces a coating of high viscosity and very low adhesive value.

From the reports of Frahm *(4)* it may be concluded that as glycopyranose polymers are heated, one of the principal condensation reactions which occurs (by the elimination of an H and OH as water) is the formation of a glucosidic linkage from the terminal carbonyl carbon to an alcoholic carbon; that the glucosidic linkage formed is intermolecular; and that probably the positions involved are carbons 1 and 6. Brimhall *(5)* has recently expanded on this theory and has proposed that a major reaction involved in the dextrinization of starch is the joining of free linear chains with the branched structures present so as to form additional branches on the complex structures.

Starches normally contain about 12% moisture and commercial samples of most varieties are slightly acid. If these starches are heated, it would seem likely that hydrolytic scission of the starch molecules, possibly with the breaking of side chains from the branched structures, could not be eliminated. This result is the opposite of the condensation reactions. Furthermore, corn starch contains a small amount of fatty acids which become active hydrolytic agents for starch at high temperatures.

* Presented by title at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 19-22, 1945.

[1] Research Laboratories, Corn Products Refining Co., Argo, Ill.

TABLE I.—ANALYSIS OF STARCH PRODUCTS MADE BY CONTROLLED DEXTRINIZATION

Heating Period Hours	% of Water-Soluble Material	% Linear Component by: Iodine Titration	Spectrophotometric Method
0	0	22–28	25–30
4	1–2	18	20.25
12	10.8	11	7.75
20	67.4	Less than 5	4.0

On the assumption that the production of a modified starch which contains branched polymer components is desirable for use in clay coatings, a dextrinization procedure which minimizes the opportunity for hydrolytic degradation and is more conducive to condensation reactions has recently been developed. The clay coating gums to be discussed in the later portion of this paper were made by this procedure.

The proportion of linear polymers present in the starch during the dextrinization procedure was followed by a potentiometric, iodine titration devised by Bates, French, and Rundle *(6)* and modified by Schoch *(7)* and by the spectrophotometric method of Kerr and Trubell *(2)*. The results of our tests show that as the reaction proceeds, the per cent of linear polymers decreases progressively until finally, for the machine coating gums, the percentage is too low to be accurately determined.

The results do not exclude the possibility that the linear component is preferentially degraded during the dextrinization and that chain lengths too short to interact with iodine are created. This view becomes less tenable when the results of the potentiometric iodine titration are plotted and the curves for the two dextrinous materials, the one containing 11% of linear component and the other less than 5%, are compared against those for an artificial mixture of free linear (unbranched) glucopyranose chains and a relatively large amount of highly branched glucopyranose polymer. These results are plotted in Fig. 1 and show the per cent of absorbed iodine against the amount of free iodine which exists in solution at any point during the titration. The artificial mixture contained by weight 10% crystalline corn amylose *(8)* and 90% of that sub-fraction of branched polymer (of corn starch) which shows the lowest limit of conversion to maltose (50%) with the enzyme, beta amylase. This sub-fraction was prepared by fractionally precipitating corn amylopectin with a mixture of methanol and butanol *(9)*.

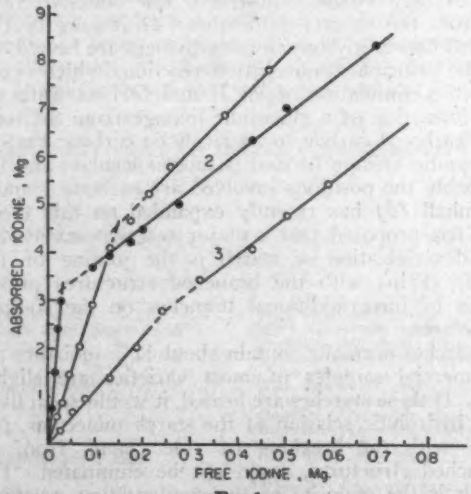

FIG. 1

Iodine Titration of Dextrins and of a Mixture of Starch Fractions. 1—Dextrin Prepared by 12 Hours Heating. 2—Mixture Containing 10% Crystalline Corn Amylose and 90% of an Amylopectin Subfraction. 3—Dextrin Prepared by 20 Hours Heating

The curves in Fig. 1 show that when a mixture of linear molecules and highly branched structures are titrated with iodine, practically all of the iodine is readily absorbed until a limiting value is reached which corresponds closely to the point where complex formation between the linear chains and the iodine is completed. After this point a relatively large concentration of free iodine is required for further absorption to take place. In the case of the two dextrins, which by this method of analysis contain the same approximate content of linear material, a much larger concentration of free iodine is required for any given amount of iodine absorbed. It may be concluded that the linear chains are no longer free, but have condensed with the branched fraction, and that the complex interferes with the ability of these linear members to form helices around the iodine molecules *(10)*.

A further difference was observed in the two sets of titrations which supports this view. When the free linear chains were known to be present, an intense blue color developed in the very early stages of the titration; when the dextrins were titrated, a purple color developed and it was only in the last stages of the titration that a blue color, of intensity equal to that given by the free linear chains, made itself evident. These observations may possibly be made the basis for a spectrophotometric method to distinguish between a branched polymer with side branches long enough to react with iodine, and a mixture which contains unassociated linear chains. Work is in progress along these lines.

Part II—Practical Aspects

Advances in the study of wetting or fluxing agents for clay in recent years has made possible the use of various modified starches as the adhesive and suspension agent in clay coatings. Formerly soda ash or borax was used in the preparation of the clay slip and when a dispersed colloid was added to these muds, composed of clays and water, the colloid was expected to suspend the clay to form a mobile coating of low viscosity and to bind the clay to the paper fiber. The selection of suitable colloids was limited mainly to casein and oxidized starches. With the advent of tetrasodium pyrophosphate and hexasodium metaphosphate to flux clay and water, it was found that clay coatings could be made by using modified starches which are less effective in their protective colloid action for clays than the oxidized or so-called chlorinated starches. When a pyrophosphate or metaphosphate is used to flux clay, the prerequisites of the added colloid are that its viscosity in water solution is low so that at the concentration used, it does not materially increase the viscosity of the coating mixture. The colloid should show little tendency to orient or gel, or to increase the plasticity of the coating mixture, and it should possess the required adhesive strength.

Early attempts to use the pyrodextrins made from starch gave poor results. When corn starch is modified by procedures commonly employed for making dextrins until its viscosity is low enough to permit the use of the product in clay coatings, its adhesive value is also reduced and a weak coating results (see, however, U. S. patent 2,355,065 (1944) recently issued to H. F. Gardiner). Recently, procedures have been developed for making a satisfactory series of

TABLE II.—CHARACTERISTICS OF LOW DENSITY CLAY COATINGS USING 15 PARTS OF STARCH PRODUCT TO 100 PARTS OF CLAY

Starch Product	% Total Solids	MacMichael Viscosity	Plasticity, MacMichael	Dennison Wax Test
Chlorinated	45	30.5	7.6	3½
Peroxidized	45	28.2	1.0	4½
Enzyme converted.	45	32	3.0	4½
Brush coating gum	45	28.5	2.5	4½

gums for use both in low and high density clay coatings as indicated above.

Low density coatings vary from 35 to 50% in total dry solids, and high density coatings from 50 to 70%. Low density coatings are fluid enough to be applied with polished metal rolls, air knives, or brushes. The high density coatings are heavy bodied and the coating is often transferred to the paper by rubber rolls. These coatings are usually applied to the paper on the paper machine and they are referred to as machine coatings.

Low Density Clay Coatings for Brush Application

The special corn pyrodextrin or gum that has been prepared for brush coating applications is a light colored powder. It is soluble in cold water to the extent of 10 to 20%. When cooked to a paste or sol by heating 20 grams of gum in 100 grams of water to 95°C. and then cooled to 25°C., the relatively clear solution has a viscosity of 100 centipoises.

Brush coatings are conveniently applied at a concentration of 45% total solids and it is customary to use a ratio of about 15 parts of starch product to 100 parts of clay at this total solids concentration. Higher adhesion may be secured by increasing the ratio of the starch product, but the gloss of the paper is reduced. A coating may be prepared using the above-mentioned proportions: 3 pounds of pyrophosphate is dissolved in 170 gallons of water and 1000 pounds of clay or similar pigment is mixed in with stirring which is continued for 15 minutes.

The adhesive is prepared by cooking 150 pounds of the brush coating gum with 75 gallons of water. The temperature is brought up to 200 to 205°F. and the paste is held at this temperature for 5 minutes. The continuously agitated cooked gum may be allowed to cool to 120 to 130°F. or added directly to the clay slip and the mixture allowed to cool to operating temperatures.

The prepared adhesive is added to the clay slip, either in a tank supplied with efficient agitation, in a ball mill, or in other mixing equipment usually employed for this purpose. Thirty-four gallons of water are added to adjust the dry solids content to 45% during the mixing. Mixing is complete when the viscosity of the mixture approaches a minimum. During the final mixing period, suitable dyes may be added to tint the coating. For white coatings, the addition of 1 to 4 ounces of Violet N, or a dye of similar color, per 1,000 pounds of clay is recommended.

The preparation of coatings which contain pigments other than clays may require some adjustment of the proportion of flux or wetting agent which is used in order to obtain a minimum viscosity. Different clays show some variation in the amount of flux required *(11)*.

The lower the density of the coating, the greater is the proportion of adhesive to clay required to obtain a specified Dennison wax test. This is shown by the following data. Thirteen parts of the brush coating gum added to 100 parts of clay has been found to give a coating with a wax test of 4 to 5 when applied at a total solids concentration of 50%. In order to obtain an equivalent wax test at a concentration of 45%, 15 parts of gum to 100 parts of clay were required and at a concentration of 38%, 18 to 20 parts of gum to 100 of clay.

A series of coating tests were made using the procedure outlined above. Various starches were employed as adhesives. The results are given in Table II.

The viscosity of the coatings was determined in a MacMichael viscometer at 25°C., using a No. 26 torsion wire. The MacMichael degrees were noted for various rotating speeds of the cup. These results were plotted one against the other, and the curve was extrapolated to zero r.p.m. The degrees at 56 r.p.m. was taken as the viscosity and the degrees estimated at zero r.p.m. as the plasticity.

Coatings having viscosities between 25 and 35 will brush satisfactorily on common equipment providing the plasticity is below 10. For the best results this value should be below 5. A coating having a plasticity of 10 or higher may show brush marks.

The Dennison wax tests were run on paper which was coated with a laboratory applicator, dried, and conditioned in a constant temperature—constant humidity room. These tests were run in quadruplicate. The whole number reported indicates no pick by the use of the wax of that number; fractions indicate the ratio of tests which show a slight pick on the next higher number wax.

High Density Coatings for Machine Application

The gum as prepared for machine coatings is 60 to 80% soluble in cold water. When cooked to a sol by heating 20 grams of the gum in 100 grams of water to 95°C. and then cooled to 25°C., the viscosity is approximately 50 centipoises.

Two hundred ten pounds of the machine coating gum is mixed with 73 gallons of water and the mixture is heated to 205°F. and held at this temperature for 5 minutes. The adhesive is cooled to 120 to 130°F. and then added to 500 pounds of clay (or other pigment) in a dough mixer. While this mixing in progress, 3 pounds of hexasodium metaphosphate and 2 pounds of soda ash, previously dissolved in a small amount of water, are mixed in, and 500 pounds more of clay is gradually added. After a mixing period of about 1 hour (during which other adjuncts and dyes may be added) the paste is run to an ink mill. A three-roll mill can be used, although a five-roll mill is preferable. After grinding, the coating is screened and passed to a storage tank which is provided with slow agitation. For whitening the coating, the addition of 1 to 4 ounces of Violet N is recommended. The coating described contains approximately 65% added solids (commercial basis) or 60% actual dry solids.

The viscosity characteristics of these heavy coatings were measured in a Brookfield viscometer using an appropriate spindle and four rotating speeds. The results are shown in Table III.

A high density coating for most types of machine application should have a certain degree of thixo-

TABLE III.—CHARACTERISTICS OF HIGH DENSITY CLAY COATINGS

Viscometer Spindle Speed R.p.m.	Viscosity of Coatings in Centipoises, Containing		Thixotropic Index Coatings Containing	
	Chlorinated Starch	Special Gum	Chlorinated Starch	Special Gum
2	408,000	48,400	5.6	4.2
4	232,000	30,600		
10	113,600	16,960		
20	72,000	11,520		

trophy so that the relatively heavy bodied coating may be transferred as a thin film (on the rollers) to the paper sheet and so that in the transference, the coating will level itself and smooth out when pressure is applied at the nip of the roller. When a doctor blade is used to spread the coating, it is essential that a given applied stress should cause the coating to flow and to level out into a smooth surface. Thixotrophy may be defined as the reduction in viscosity for a given increase in the applied shearing stress. When the Brookfield viscometer is used to measure viscosity, a thixotropic index may be taken as the viscosity at 2 r.p.m. divided by the viscosity at 20 r.p.m. and this value should be between 4 and 6 for most applications of coating which contain 60% dry solids. Both coatings studied are suitable in this respect.

However, it will be noted that at a concentration of 60% solids, the coating which contains the chlorinated starch has a viscosity more than six times that of the coating which contains the machine coating gum. The former coating is too thick to be usable, and it was diluted with water until its viscosity was comparable to the viscosity of the coating made with the special gum. The diluted chlorinated starch coating contained 49% of dry solids. Both coatings were applied to paper by machine application. The chlorinated starch-clay coated paper gave a Dennison wax test of 10, the gum-clay coated paper a wax test of 11. The gloss of each was quantitatively measured by reflection and found to be comparable and satisfactory.

Coated paper having a wax test of 4 to 5 is suitable for many purposes. For the degree of adhesion indicated by this wax test the ratio of the machine coating gum may be reduced to between 12 and 15 parts per 100 parts of clay, and the total solids in the coating may then be increased to between 65 and 70%.

High density coatings with lower starch to clay ratios have the advantages of efficient use of adhesive, low drying time, high machine speed, ease of calendering, good gloss, and smoothness.

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Centrifugal Pumps for Paper Mills

Ingersoll-Rand has just issued a new 20-page catalog entitled, "Centrifugal Pumps for Pulp and Paper Mills". The book is a comprehensive and informative piece of trade literature that covers all the pumping needs of the industry from the hydraulic barker to the coating room, and also, pumps for fire protection and plant water supply.

The center spread features a flow-chart showing the types of pumps used, and their positions in the various processes. This chart follows through the three classes of pulp—ground wood, chemical wood, and pulp from rag, straw, waste, and hemp—from the raw material down through the paper machine to the calenders.

The book is notable for its use of drawings of typical paper products, and of cross-section blueprints and charts, factors which add to its readability and interest. Also commendable is the manner in which each type of pump is explained as to its uses and construction. These types are classified according to processes, such as stock, liquor, and acid pumps. Further classification explains variations in construction such as cradle-mounting, double suction, axial and mixed flow, horizontal and vertical, and multistage.

This is a catalog that should find its way to the desks and reference files of production and operation officials. Ingersoll-Rand Company, 11 Broadway, New York 4, N. Y. or branches throughout the country. Ask for Form 7022.

New TAPPI Members

The executive committee of the Technical Association of the Pulp and Paper Industry has elected the following to membership:

John Carson, assistant technical director, the Mead Corporation, Dill & Collins Division, Philadelphia, Pennsylvania, a 1936 graduate of Temple University.

Gilbert E. Hutchinson, research chemist, Remington Arms Company, Bridgeport, Connecticut, a 1939 graduate of Colby College.

Christopher J. Krogel, engineer on pulp insulated wire process, Western Electric Company, Inc., Kearny, N. J., a 1930 graduate of Rensselaer Polytechnic Institute.

Carleton E. Marble, tour boss, Container Corporation of America, Chicago, Ill. Attended the University of Cincinnati.

Ernest J. Oakleaf, chief draftsman, Crossett Paper Mills, Crossett, Ark. Attended Malmo Tekniska Skola, Malmo, Sweden.

Philip L. Talips, chemical engineer, Lowe Paper Company, Ridgefield, N. J., a 1939 graduate of Bucknell University.

Wilmer W. Wagner, Jr., production manager, Eastern Box Company, Baltimore 26, Maryland, a 1938 graduate of Johns Hopkins University.

Benjamin F. Warren, chief industrial engineer, Crown Zellerbach Corporation, San Francisco 19, Cal., a 1935 graduate of Stanford University.

Factor of Interest in Canada

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., February 19. 1945—Two factors of dominant interest in the industry have been brought to the fore in press comments here in the past week. They are the prospect of an early decision by the federal authorities on the basis of taxation to be set up for the pulp and paper companies, which some observers believe will be announced before the end of the month, and a mooted $2 a ton increase in newsprint prices, which is expected to take effect about April 1st. The first item, as well as the second, is regarded as likely to have a constructive effect, and, combined with what are regarded as improved postwar prospects for world trade, in which an excess of demand over supply for pulp and paper is forecast for some years to come, have had the effect of heightening interest in newsprint stocks, long the leaders on the Montreal Stock Exchange. In this latter connection Bathurst "A" stock has attracted particular attention, heavy buying at several recent sessions being variously attributed to refugee money and to New York interests seeking to gain control of the company. Whatever the cause, in a single day's trading more than 5,000 shares of this stock changed hands, with a net gain of about ¾ of a point.

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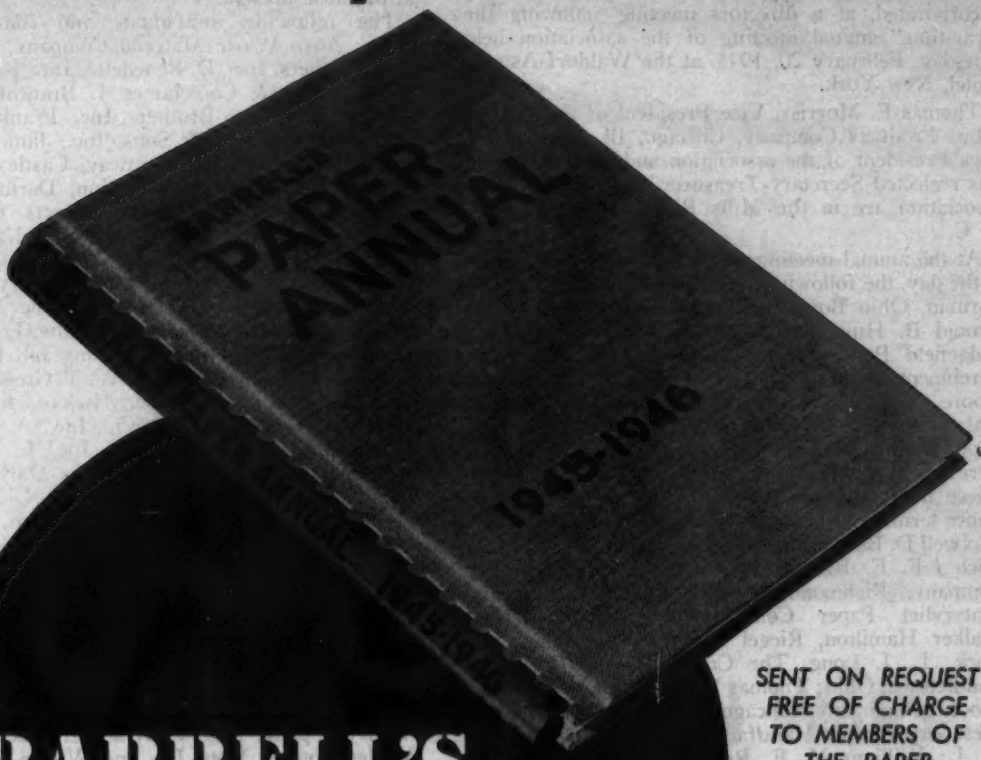

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Association of Pulp Consumers

Walker Hamilton, vice president of the Riegel Paper Corporation of New York City, was elected President of the Association of Pulp Consumers, Incorporated, at a directors meeting following the "war-time" annual meeting of the association held Tuesday, February 20, 1945, at the Waldorf-Astoria Hotel, New York.

Thomas E. Morriss, Vice President of the Central Fibre Products Company, Chicago, Ill., was chosen Vice President of the association and C. V. Maudlin was reelected Secretary-Treasurer. The offices of the association are in the Mills Building, Washington, D. C.

At the annual meeting of the members held earlier in the day, the following were elected directors: C. M. Forman, Ohio Boxboard Company, Rittman, Ohio; Arnold B. Huyssoon, Continental Paper Company, Ridgefield Park, N. J.; E. R. Leonhard, Paterson Parchment Paper Company, Bristol, Pa.; Paul F. Moore, Westfield River Paper Company, Russell, Mass.; Robert B. Stevens, Stevens & Thompson Paper Company, Greenwich, N. Y.; and W. B. Zimmerman, Maxwell Paper Company, Franklin, Ohio. These men will serve with the following directors whose terms continue through the coming fiscal year: Maxwell D. Bardeen, Lee Paper Company, Vicksburg, Mich.; F. E. Brown, Manchester Board & Paper Company, Richmond, Va.; George K. Ferguson, Watervliet Paper Company, Watervliet, Mich.; Walker Hamilton, Riegel Paper Corporation, New York; L. J. Long, The Crystal Tissue Company, Middletown, Ohio; Thomas E. Morriss, Central Fibre Products Company, Chicago, Ill.; George F. Moxley, West Jersey Paper Manufacturing Company, Camden, N. J.; William M. E. Roberts, Fox River Paper Corporation, Appleton, Wis.; and Austin P. Story, The Chillicothe Paper Company, Chillicothe, Ohio.

In his report to the members, Dwight L. Stocker, the retiring President, stressed the important part played by the consumers of purchased pulp in producing paper and paperboard for use in the war effort and for essential civilian needs. Mr. Stocker pointed out that the large amount of waste paper and rag processing equipment operated by the members had enabled them to "stretch" the limited amount of market wood pulp available to them and as a result, they have been able to produce greatly increased quantities of paper and paperboard for military and essential civilian needs.

The secretary told the members that the association now represents 282 mills producing paper and paper board and that a recent check indicated that there were only 51 firms dependent on purchased wood pulp which are not members.

A majority of the members were represented at the meeting by proxies, since in accordance with the request of the Director of War Mobilization that the attendance at meetings be held to an absolute minimum, the Association had urged that members who did not plan to be in New York on other business on the day of the meeting vote by proxy.

Paper Mill Supply Dealers Banquet

The thirty-seventh annual banquet of the New York Association of Dealers in Paper Mills' Supplies was dedicated to the men in the armed services some of whom attended the banquet as honored guests of a number of representative firms in the industry. The banquet was largely attended and was a great success in every respect. A first class entertainment followed the banquet which was greatly enjoyed by all of those present.

The following individuals and companies had tables: Anro Waste Material Company, Inc., Atterbury Brothers, Inc., D. Benedetto, Inc., Robert Blank, Alfred Bloch & Co., James J. Brancato, Chas. J. Browne, Cantasano Brothers, Inc., Frank Cantasano, Inc., John H. Carlo & Sons, Inc., James Carrano's Sons, Inc., Robert S. Carraway, Castle & Overton, Inc., Conti-Williams Corporation, Darmstadt, Scott & Courtney, Delia Waste Products Corporation, Derrico Company, Inc., Economy Baler Company, Eolio Corporation, Federal Waste Paper Corporation, S. J. Fisher, Inc., James T. Flannery Company, Gaccione Brothers & Co., Inc., Globe Mill Supply Company, Goldman, Harris Company, Louis Gottlieb & Co., Inc., Great Eastern Packing and Paper Stock Corporation, John D. Greco, W. J. Green Company, Inc., Daniel M. Hicks, Inc., Hicks-Costarino Company, Inc., I. Hershman & Co., Inc., A. Imperatrice & Sons, Inc., E. J. Keller Co., Inc., L. & H. Levy, Inc., D. Lo Pinto & Sons, Charles Maronna & Co., Inc., Masterson Brothers Company, N. Mastronardi Sons, Inc., Melrose Salvage Corporation, George W. Miller & Co., Inc., L. & R. Moelis, Alfred J. Moran, National Association of Waste Materials Dealers, John L. Nielsen, Panariello & D'Aniello, Martin Patricoff, Pleasant Waste Material Company, Rag Processing Corporation, R. Rava & Sons, Rosenberg, Waldman & Cohen, S. Schapiro & Sons, Inc., Hon. Joseph T. Sharkey, William Steck & Co., Inc., Sterling Mill Supply Company, Inc., Toga Paper Stock Company, Inc., Valve Paper Stock Company, Walden Sons & Mott, Inc. and Wilson Paper Stock Company, Inc.

The officers of the association are as follows: President, Gus R. Holm; first vice president, Paul J. White; second vice president, Morris Kay; secretary-treasurer, Alfred J. Moran.

Walter H. Martens was chairman of the banquet committee and John L. Nielsen and Arthur Rosenfeld served with him.

Kraft Paper Association

The Kraft Paper Association held its annual meeting at the Waldorf-Astoria on Wednesday, February 21 and elected the following officers: president, Willard J. Dixon, vice president of the St. Regis Paper Company; vice president, George Stuhr of the International Paper Company and secretary-treasurer, Dernell Every. The executive committee consists of the following: W. H. Anders, O. P. Carter, H. S. Daniels, J. R. Diggs, K. O. Elderkin, R. L. Fitts, G. F. Henderson, R. A. McDonald, S. M. Phelan, Jr. and C. W. Smith.

Newsprint Mfrs. Assn. of the U. S.

The Newsprint Manufacturers Association of the United States held its annual meeting at the Waldorf-Astoria on Wednesday, February 21 and elected the following officers: president, Harold S. Smith, president of the Maine Seaboard Paper Company; vice presidents, John S. Hobson of the St. Croix Paper Company and J. D. Zellerbach of the Crown Zellerbach Corporation; secretary-treasurer, E. O. Merchant, 122 East 42nd street, New York.

THE STUFF THAT HELPS WIN WARS

SPRUCE WOOD—CELLULOSE FIBERS—it looks peaceful and harmless enough. But without it modern war could not be waged—and won.

From explosives to plastics, the list of strange products that come from this source is a long one.

But just as important as these in the winning of the war is the paper that is made from those same spruce logs. Orders, records, reports—all written on paper—speed our armies and help us on the home front to back up the fighting men.

Paper is important; let's use it carefully.

HAMMERMILL

HAMMERMILL PAPER COMPANY

ERIE, PENNSYLVANIA

Hollingsworth & Whitney Get E Award

In a colorful ceremony, the Chickasaw mill of the Hollingsworth & Whitney Company at Magazine Point, Ala., was presented with the Army and Navy E at the mill, Friday afternoon, February 16.

It is stated that of all the plants producing war materials in the country, only three and one-half percent have received the "E" award, and that the Chickasaw Mills of Hollingsworth & Whitney Company is not only the first kraft paper mill in the country but the only paper mill in the entire south to have won this honor.

In commenting on the award, D. E. Cousins, mill manager, stated: "The Army-Navy "E" Award represents a recognition of the production of the high strength papers for which this mill was designed, but is primarily a tribute to the skill of our employees and their fine achievement under the difficulties of war-time conditions.

"We are justly proud of the loyalty and industry of our employees in all departments whose joint efforts contributed to this outstanding recognition by the Armed Forces.

"It is also significant to keep in mind," Mr. Cousins said, "that the earning of the award would not have been possible without the splendid cooperation of our woods organization, responsible for maintaining consistent supply to the mill of the pulpwood from which the paper is manufactured. In order to furnish a mill of this size with this essential raw material, it is necessary that hundreds of men participate in the cutting, logging, hauling and transportation of the pulpwood to the mill. We take this opportunity of expressing to all these many hundred individuals the appreciation of the Chickasaw Mill employees.

Hon. Frank William Boykin, Representative in Congress, delivered the principal address at the presentation ceremonies Friday afternoon. The Army Ordnance department sent to Mobile to attend the ceremonies Col. S. M. Strohecker, its chief contracting officer for all ordnance explosive and shell loading plants.

Formal presentation of the award was made by Major Roy D. Hickman, chief, General Office Division, Birmingham Army Ordnance District, and the presentation of the "E" pins to employees by Lt. Commander J. W. Kline, USNR, Chickasaw Naval Receiving Station. M. L. Madden, president, accepted award on behalf of the men and women of the Chickasaw Mills, and acceptance of the "E" pins was made by the following: Alva M. Jordan, president, Chickasaw Local 421, I. B. Paper Makers; J. U. McCrary, president, Mobile Local 423, I. B. Pulp, Sulphite and Paper Mill Workers; and C. W. Wright, vice president, Local B-1315, I. B. Electrical Workers.

Ralph H. Thompson Dead

Ralph Harrison Thompson, president of the Diamond Mills Paper Company, Inc., Saugerties, N. Y., died at his residence, 655 Park avenue, New York, N. Y., February 15, 1945, of a heart attack.

Mr. Thompson, who was actively engaged in the affairs of the company until a short time before his death, assumed the presidency of the Diamond Mills Paper Company in 1909 upon the death of his father, Colonel George W. Thompson, who founded the company in 1872. He was a member of The Metropolitan Club of New York.

Salesmen's Association

At the twenty-sixth annual meeting of the Salesmen's Association of the Paper Industry, held at the Waldorf-Astoria Hotel, New York on February 19, the following officers were elected: president, Stanley O. Styles, Martin Cantine Company; Eastern vice-president, E. F. Miles, Crocker-McElwain Company; Eastern assistant vice-president, Allen B. Helffrich, St. Regis Paper Company; Western vice-president, F. D. Patterson, Flambeau Paper Company; Western assistant vice-president, E. J. Edwards, Howard Paper Company; secretary-treasurer, E. O. Merchant, 122 East 42nd street, New York.

Glassine and Greaseproof Mfrs. Assn.

The Glassine and Greaseproof Manufacturers Association held its annual meeting at the Waldorf-Astoria Hotel February 21 and elected the following officers: Chairman, Paul F. Moore, president, Westfield River Paper Company; Folke Becker, president, Rhinelander Paper Company; Paul E. Hodgdon, president, Deerfield Glassine Company; John L. Riegel, president, Riegel Paper Corporation; Arthur Schwab, Hamersley Manufacturing Company; secretary-treasurer, Thos. J. Burke.

Blotting Paper Mfrs. Association

The Blotting Paper Manufacturers Association held its annual meeting Monday, February 19, at the Waldorf Astoria Hotel, New York. The following offcers were elected: president, J. J. Halowell, Wrenn Paper Company, Middletown, Ohio; vice-president, L. D. Nicolson, District of Columbia Paper Mills, Inc., Washington, D. C.; secretary-treasurer, James L. Ritchie, Blotting Paper Manufacturers Association, 122 East 42nd street, New York.

Sangamon to Start Eaton Mill Soon

Sangamon Paper Mills, which recently purchased the Eaton, Ind., straw board plant from Ball Brothers Company of Muncie, Ind., expect to have the mill in production within sixty days. The plant is located on the Mississinewa River at Eaton approximately ten miles north of Muncie. The new owners will produce imitation kraft papers, .009 bogus kraft corrugating medium and .016 liner.

Aldine Paper Co. Moves

The Aldine Paper Company moved on February 10 to 535 Fifth avenue, corner of 44th street, New York. The new midtown quarters of the company are modern, spacious and inviting. Every department has been expanded so as to render a more efficient and complete service during these critical days and in the post-war period. The new telephone number of the company is VAnderbilt 6-2100.

Swenson-Nyman Pulp Washer Bulletin

Just off the press is a new catalog bulletin issued by Swenson Evaporator Company, Division of Whiting Corporation, Harvey, Ill. covering the Swenson-Nyman line of pulp washers. The outstanding features of these washers are fully covered in this publication which is illustrated throughout with photographs and diagrams. This eight-page, two-color bulletin will be sent to interested persons free upon request. Write for F-104.

M. S. Wunderlich to Be Research Dir.

Milton S. Wunderlich, general sales manager of the Insulite division of Minnesota and Ontario Paper Company has been named director of research of the parent company and affiliates according to an announcement by R. H. M. Robinson, president. He is succeeded by M. C. "Al" Fairfield, merchandising manager of the Insulite division.

Coming to M & O in 1932 as a member of the research staff, Mr. Wunderlich assisted the sales department in the technical phase of their selling activities before going to Europe in 1935 as engineering consultant to the Insulite mill in Finland.

Upon his return to this country, he reentered research work and in 1938 was transferred to International Falls as assistant resident manager of the mill there. He has been general sales manager of the Insulite division since 1942.

A graduate of the University of Minnesota College of Engineering in 1919, Mr. Wunderlich entered the insulation field the same year with the Flax-Li-Num Insulating Company, St. Paul, Minnesota, in charge of engineering. While there, he was responsible for organizing and operating a research department and also assisted the sales department with technical selling problems. He became an assistant to the president and general manager in 1926 until 1932. Mr. Wunderlich is married and has two sons and one daughter.

Mr. Fairfield, who has been with Insulite since 1935 in the capacity of advertising manager and later merchandising manager, also did his first work in the insulating field with the Flax-Li-Num Insulating Company where he was in charge of advertising and sales promotion.

In 1933 he became manager of the Philadelphia sales branch of Brandtjen and Kluge, Inc., printing equipment manufacturers and joined Insulite in 1935 as advertising manager. He was appointed merchandising manager in 1940. He was born at Dixon, Ill.

Time Schedule Controller

To assure uniform quality of product, most batch processes require the accurate repetition of a predetermined program involving time coupler with temperature, pressure, flow or liquid level. For this purpose, the Taylor Instrument Companies of Rochester, N. Y., manufacture a time schedule controller about which they have published an 8-page descriptive bulletin.

Of special interest to the paper industry is the application of the instrument to controlling the pressure of the stock against the bed plate. It is also used extensively in starch cooking.

Liberally illustrated with photographs showing actual applications, as well as cut-away view of the instrument itself, the new bulletin covers such topics as:

1. How a control schedule is established.
2. How a control schedule is accurately repeated time after time.
3. How auxiliary functions can be accurately synchronized with control of the main variable at any point in the processing cycle.
4. How processing schedules can be easily changed as to time and variable control.
5. How to select a Taylor Time Schedule Controller.

Those interested in having a copy should write to the Taylor Instrument Companies, Rochester 1, New York, for Bulletin 98165.

HOLLINGSWORTH & WHITNEY COMPANY

Manufacturers of Exacting Papers

including

Artillery Shell Container Paper
Milk Bottle Cap & Hood Stock
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Metal Separator Papers
Tabulating Card Stock
Dynamite Shell Paper
Multi Wall Sack Paper
Map and Chart Papers
Condenser Tube Paper
Impregnating Paper
Drinking Cup Paper
Spiral Can Stock

Awarded to our CHICKASAW MILLS, MOBILE, ALABAMA.

OFFICES
BOSTON NEW YORK CHICAGO

MILLS
WINSLOW & MADISON, MAINE,
MOBILE, ALABAMA

To Vote on Sale of Bryant Paper Co.

KALAMAZOO, Mich., February 19, 1945—A proposal to sell virtually all the local properties of the Bryant Paper Company to Time, Inc., of New York for approximately $2,300,000 will be submitted to the stockholders at a special meeting here Thursday afternoon, March 1. This announcement was made jointly Saturday afternoon by Charles L. Stillman, treasurer of Time, Inc., in New York and by Allan B. Milham, president of the Bryant Paper Company, at his offices here.

If the sale is approved, the Bryant Company will become a wholly owned subsidiary of the great New York firm, which publishes the four Henry Luce magazines of nation-wide circulation — *Time, Life, Fortune,* and *the Architectural Forum.*

The sale, if consummated, will mark the fiftieth anniversary year of the Bryant Company, for many decades one of the world's largest manufacturers of magazines and book paper. But no change in management or plant personnel is contemplated, Mr. Stillman said. Allan B. Milham would remain president, although N. L. Wallace, production manager and assistant vice president of Time, Inc., would become a vice president and member of the new board.

In a statement released from his offices in New York, Mr. Stillman said the business of the Bryant Paper Company, under its new owners, would be carried on as at present. And he added that "any demands which Time, Inc., might make upon Bryant's production would be of such a nature that they could be met without sacrificing any of the old company's present customer relationships." The latter, he said, was "a consideration of prime importance."

Michigan Div. Holds Coating Meeting

KALAMAZOO, Mich., February 19, 1945—The Second annual "Coating" meeting sponsored by the Michigan Division of the American Pulp and Paper Mill Superintendents Association was held at the Park American Hotel Thursday evening, February 15 with seventy-five members and affiliates attending. Chairman Joe Waber presided and expressed his pleasure over the large attendance and thanked the special coating committee of which Leon H. Mimms was chairman, for their work in making the meeting a success. A special guest Arnold McAneny of the Bradner Smith Company Chicago, was introduced and instantly put those present in good humor in a very too brief response. The speaker for the occasion Arthur Brooks, technical director of the American Color Type Company of Chicago was then introduced and his intimate address titled "Printers' Problems and Advertisers' Demands and Their Effect on Coated Papers" was a perfect non-technical talk. Mr. Brooks' background of experience in color and gravure work makes him a master of the subject and his talk embraced most of the angles and problems of high class printing. He did in the course of his remarks relate what in his opinion were some of the shortcomings on the part of the paper makers but was equally as critical of those in his own industry and stressed the point of a closer cooperation between the manufacturers and printers. He predicted nothing of a startling nature, to be developed following the war's end, but was sure of many improvements on the equipment and methods now in use. A spirited forum followed Mr. Brooks' talk and much interesting information came out of it. Those present were:

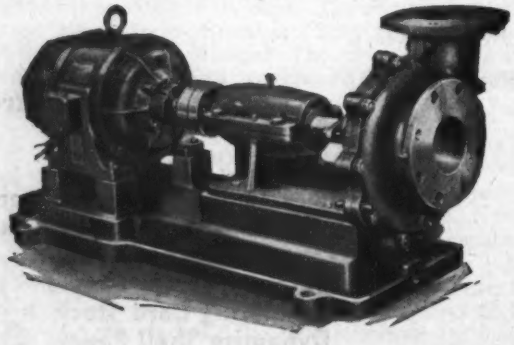
FREDERICK HAS THE ANSWER
. . . TO YOUR PUMPING PROBLEMS

When considering the installation of pumping equipment, it is highly advisable for the prospective purchaser to consult with our engineering department.

Gives us this information—
What are the conditions under which your pumps must work?
What kind of work must your pumps do?

With this data at hand, we will recommend a FREDERICK pump which, in design and operation will exactly meet your requirements.

For over 25 years we have been making fine pumps . . . in one plant alone over



800 of the particular type and make here illustrated are in use . . . one reason why we have the answer to your pumping problems.

THE Frederick IRON & STEEL CO.
Frederick, Maryland
OVER 25 YEARS' EXPERIENCE BUILDING FINE PUMPS

"IT'S TIME WE PLANNED FOR
BIGGER SALES...
IN EASTERN U. S."

HUBBS HOUSES CAN HELP!

The salesmen of our combined houses make frequent contacts on the important paper and paper products users in *America's No. 1 Market* . . . . from Indiana east. They are experienced in modern merchandising . . . . skilled in introducing new lines.

Contact the nearest Hubbs House to learn how this marketing force may help you!

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DISTRIBUTORSHIP
that means
LEADERSHIP

the HUBBS HOUSES

Contact the Hubbs House Nearest You
Established 1855

CHARLES F. HUBBS & COMPANY
Lafayette Street Warehouse
Beekman Street Warehouse
NEW YORK, N.Y.

HUBBS & CORNING COMPANY
BALTIMORE, MD.

HUBBS & HOWE COMPANY
BUFFALO, NEW YORK

HUBBS & HASTINGS PAPER CO.
ROCHESTER, NEW YORK

CHARLES F. HUBBS & COMPANY
BRIDGEPORT, CONN.

INTERSTATE CORDAGE & PAPER CO.
PITTSBURGH, PA.

HUBBS PAPER CO., INC.
HOLLIS, NEW YORK

HUBBS & HOWE COMPANY
CLEVELAND, OHIO

HOLLAND PAPER COMPANY
BUFFALO, NEW YORK

CHARLES F. HUBBS & COMPANY
TROY, NEW YORK

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VICTORIA PAPER & TWINE CO., LTD.
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VICTORIA PAPER & TWINE CO., LTD.
HALIFAX

GARDEN CITY PAPER MILLS CO., LTD.
ST. CATHARINES, ONT.

CANADIAN VEGETABLE PARCHMENT CO., LTD.
MERRITTON, ONT.

COLOR CONTROL
on Box Board . . .
or Rag Bond

Through the spectroscope or through bifocals, color-coded papers made with National Paper Dyes run true-to-tone. For systematizing forms, for self-identifying wrappers and cartons, for any purpose where crisp uniformity of color is needed, National Paper Dyes meet every requirement.

National offers also the expert assistance of practical technicians in developing color formulas and stock compositions to meet your exact needs. We invite you to use this helpful service.

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ALLIED CHEMICAL & DYE CORPORATION
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PROVIDENCE SAN FRANCISCO ATLANTA PORTLAND, ORE.
CHICAGO CHARLOTTE NEW ORLEANS TORONTO

Chairmen for Red Cross Drive

Manhattan's chemical, paper and beverage industries, led by Charles D'W. Gibson, vice-president of Air Reduction Sales Company as chairman and John D. East of the same firm as co-chairman, have completed their organization for the Red Cross 1945 War Fund, it was announced last week by William B. Given, Jr., Chairman of the Red Cross Manhattan Committee, major fund-raising unit of the campaign.

Mr. Gibson's section of Commerce and Industry includes 51 groups and divisions which also embrace the fields of breweries, drugs, paints and varnishes, carbonated beverages, wines and liquors, tobacco, newsprints and paper containers.

The nation-wide Red Cross appeal for aid to the nation's fighting men and service women, their families and essential home-front services will be launched on March 1 with a goal of $200,000,000.

Among those serving with Mr. Gibson and Mr. East as group and division chairmen are the following: Charles A. Mace, adhesives; Frederick E. Ruhling, specialty bags and cups; David Rous, corrugated box manufacturers; William Conescu, folding boxes; Harry Roden, set-up boxes; George E. Ruppert, Charles M. Richter, dye stuffs; M. F. Roche, envelopes; Herman Scott Chalfant, newsprint; Allan Brown, plastics; Roy K. Ferguson, paper; Dr. E. O. Merchant, paper-miscellaneous (associations); Gerald F. Dunne, package stores; Frank W. Smith, paper exporters; George Sturr, kraft paper; T. A. Henry, fine paper and specialties; W. L. Raymond, book and coated paper; Charles J. Slicklen, coarse paper merchants; Frank W. Leonard, fine paper merchants; Joseph A. Benedetto, old paper and rags; Samuel L. Wallerstein, corrugated paper jobbers; and Fred Enders, pulp agents.

Marathon Corp. Changes

Marathon Corporation, Menasha, Wis., announces a number of changes and additions to the field sales force of their jobber sales division. The enlarged staff will provide better coverage of territories and improved service for jobbers. Gordon Becker is taking over the Cleveland area, while Len Nichols shifts to Pittsburgh to replace Gordon Becker. Mr. Nichols' former Indiana territory will be served by a new salesman, Don Kneipple. Mr. Kneipple is already well-known around Indianapolis, having had twelve years of sales experience in that section.

Clarence Young has moved from Cincinnati to Appleton, Wis. and will take over the Wisconsin and Upper Michigan area. Bob Kuehl, former representative in this territory is now specializing in product development at the Menasha office with special emphasis on frozen food locker packages and specialties. Jim Smith, another new Marathon salesman with several years' experience with the paper trade in the New York jobber field, is taking over the Buffalo area.

Robert King, formerly manager of a wholesale grocery in Upper Michigan will represent the Jobber Division in North Carolina. Mr. King has had eleven years' experience in the grocery and produce field, both retail and wholesale. Two other representatives are being transferred from the Menasha Office sales staff to the field force after several years in service and promotional capacities. They are Jack Thomsen, assigned to the middle Ohio territory and Cliff McCarthy, who takes over the Milwaukee assignment from Jim McKenny. Mr. McKenny has resigned to accept a position as sales manager of the Universal Paper Company in Appleton, Wis.

TRADE MARK

Trinity Bag & Paper Co., Inc.

25 WEST 43rd STREET • NEW YORK 18, N. Y.

Mill Agents and Distributors

PAPER BAGS AND SACKS
All Types and Styles
Self-Opening, Square
Flat and Sacks

WRAPPING PAPERS
Kraft—Bleached and Unbleached
Butchers—Dry and Water Finish
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WRITINGS
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Index

OTHER GRADES
Envelope, Offset and Printing
Gumming—Bleached and Unbleached
Kraft Specialties of all Descriptions — both Bleached and Unbleached

Agents for:

FLORIDA PULP & PAPER CO., PENSACOLA, FLA. • SANTA ROSA PULP & PAPER CO., PENSACOLA, FLA.

BAG PLANTS AT MOBILE, ALABAMA, AND MONROE, LA.

Tried for Theft of Rationing Paper

BOSTON, Mass., February 19, 1945—John Monoghan and Alfred A. Vergari of Fitchburg, on trial on charges of conspiracy in connection with the theft of a 250-pound roll of government rationing paper from a Fitchburg mill, changed their pleas to guilty in U. S. District Court February 15.

Six other defendants pleaded guilty Wednesday, leaving only Monoghan and Vergari on trial. Judge Arthur D. Healey continued the cases of all eight for disposition. Joseph J. Gotlieb, assistant U. S. attorney indicated he would ask for sentencing Tuesday, February 27.

During the trial, Gotlieb charged that the eight men conspired to use the stolen ration paper for the printing of spurious gasoline coupons with a potential value of $3,000,000, and that a number of bogus A-11 coupons had been printed on paper from the roll.

Amends Export Price on Towels

Manufacturers who sell toilet tissue and paper towels to exporters may add to their maximum domestic prices an amount equal to the lower of the export differentials used in the two base periods—October 1-15, 1941, and March 1942—the Office of Price Administration announced on February 16. However, the agency explained, the resultant price may be no higher than the manufacturer's March 1942 maximum price to exporters.

Sales to exporters, as provided in the export price regulation, previously could not exceed domestic prices by more than packing and other export service expenses. Manufacturers of tissue-paper products have been limited to domestic prices plus service charges in selling to exporters even though they charged higher prices to this class of purchaser before price control. Today's action, effective February 20, 1945, OPA said restores customary business practices in the industry by allowing these manufacturers to use the lower of the differentials charged in the base periods provided in the tissue-paper-products regulation.

The action also provides that on sales of a new product to exporters a manufacturer may add the same dollar-and-cent differential that was applied to his most comparable product during the appropriate base period.

When manufacturers export these products themselves, OPA explained, they are still subject to the maximum prices provided in the Second Revised Maximum Export Price Regulation.

Celebrate Year of Safe Operation

A safety party was held Saturday evening, February 10, at the Menasha, Wis., Eagles hall to celebrate another year of safe operation in the wax refinery and carton shipping departments of the Menasha Products division of Marathon Corporation.

H. H. Aderhod, safety director, congratulated the departments on their outstanding performance, and exhibited two trophies won by the company in the last year. One was awarded by the Employers Mutual Liability Insurance Company, and the other by the National Safety Council. W. P. Wasmer, safety engineer, showed a movie on safety in the home, and two sports films.

The last accident in the wax refinery department occurred November 4, 1937, and the last one in the carton shipping department, on February 28, 1939.

SINCE 1828 — CONTINUOUSLY WE HAVE SERVED THE PAPER INDUSTRY.

The war is not over. But when it is over, will you be among the first to receive new equipment?

We can now book approved orders which will be filled in the order received.

Some will have to wait—so plan now to be the first.

Paper Bag Machines
Paper Machines Jordans
Paper Trimmers—new model E.

THE SMITH & WINCHESTER
MANUFACTURING COMPANY
PLANT AND OFFICES AT SOUTH WINDHAM, CONNECTICUT

Consider Forest Legislative Proposals

Legislative proposals, industrial forests and forest inventories occupied the attention of the attention of the Forest Industries Information Committees of Wisconsin, Michigan and Minnesota at a joint session held in Milwaukee on February 1. Originally called as a Wisconsin meeting, a representation from the newly organized Michigan Committee including Chairman, Abbott M. Fox also attended, together with Chairman L. A. Furlong of the Minnesota Committee. Present likewise were Jay Price, regional forester; S. L. Denmon, director, Lake States Forest Experiment Station; F. G. Wilson, Wisconsin Conservation Department; Stanley G. Fontana, Michigan Conservation Department. National Committee Chairman, E. W. Tinker and Secretary, Donald M. Rochester of New York City, together with Harris G. Collingwood, National Lumber Manufacturers Association, Washington, D. C. participated in the meeting. A Wisconsin legislative proposal originating in the Wisconsin Conservation Department which would prevent the unrestricted cutting of immature timber was explained by Mr. Wilson and discussed by the committee without any formal expression of the committee's attitude being taken. Regional Forester Price talked on the Maryland bill and the so-called "model" bill sponsored by the Council of State Governments. Stanley Fontana explained a proposal of similar intent now under discussion in Michigan.

Forest Inventory

Mr. Tinker said there was a very acute need for an estimate of forest stands and tree growth in the Lake States which could be related to present and future requirements of the industries—particularly with respect to pulpwood. Mr. Price outlined a plan whereby the Forest Service would undertake to make such a study. This would require information with respect to wood requirements from the pulp and paper mills which cooperation urged be extended by the industry and for which a committee will be appointed to cooperate with Mr. Price's office. F. E. Sensenbrenner of Kimberly - Clark Company and George Kilp, Nekoosa-Edwards Paper Company both stated that the lack of this type of information was a definite handicap in industrial planning in the pulp and paper industry.

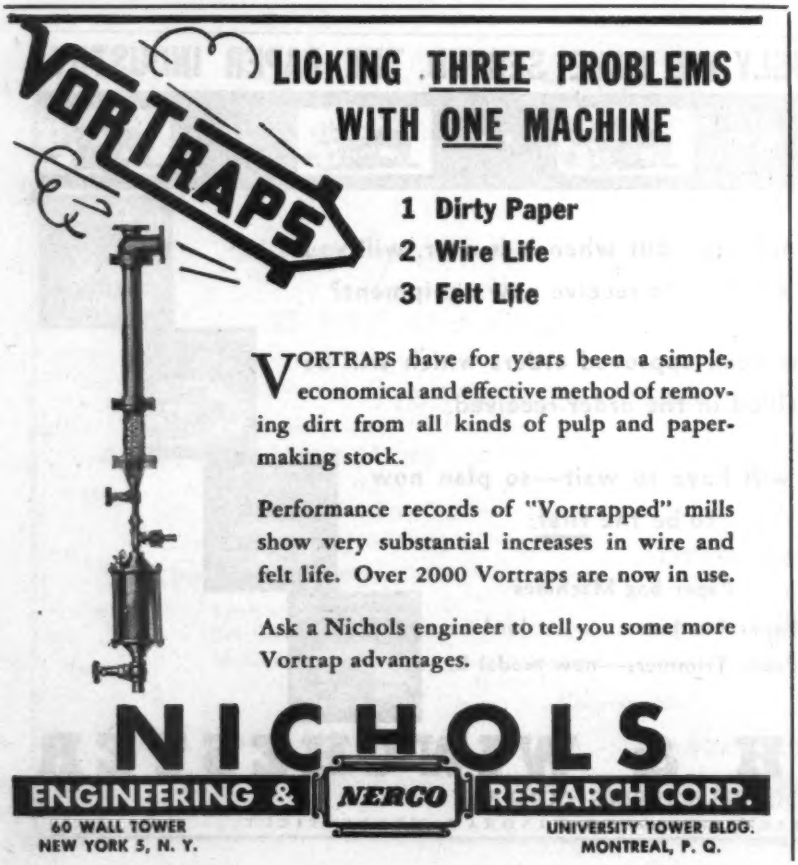
Industrial Forests

On behalf of the Wisconsin Conservation Commission, Mr. Wilson announced the certification of industrial forests of Nekoosa - Edwards Paper Company, Consolidated Water Power and Paper Company, Rhinelander Paper Company, Mosinee Paper Company, and the Holt Lumber Company totalling 192,051 acres with 21,780,000 trees planted.

Mr. Wilson declared that Wisconsin is leading all states in reforestation by industries citing the following figures as to the private and public forests in Wisconsin: County Forests, 1,948,616 acres; Federal Forests, 1,357,915 acres; State Forests, 236,673 acres; Community Forests, 14,477 acres; Industrial Forests, 300,184 acres.

Treasurer O. T. Swan reported committee finances to be in a comfortable condition due to the satisfactory response from the Wisconsin industries.

Another meeting of the Wisconsin committee is scheduled to be held in Wausau on March 6 to endeavor to develop a definite expression from the committee on the Wisconsin regulatory proposal.


VORTRAPS
LICKING THREE PROBLEMS
WITH ONE MACHINE
1 Dirty Paper
2 Wire Life
3 Felt Life
VORTRAPS have for years been a simple, economical and effective method of removing dirt from all kinds of pulp and paper-making stock.
Performance records of "Vortrapped" mills show very substantial increases in wire and felt life. Over 2000 Vortraps are now in use.
Ask a Nichols engineer to tell you some more Vortrap advantages.
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ENGINEERING & NERCO RESEARCH CORP.
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NEW YORK 5, N. Y.
UNIVERSITY TOWER BLDG.
MONTREAL, P. Q.

Morocco's Paper Industry

Morocco's three paper and cardboard mills have been of immeasurable benefit during the war and although Morocco is completely lacking in forests to provide wood pulp, the industry by utilizing waste paper, rags and certain native fibrous plants has been able to meet at least partially the demand for indispensable products, says a report to the Department of Commerce.

A strict policy of economy, however, is still required and in the month of October, when Morocco imported 285 metric tons of various types of paper, the Office of Public Economy had to take charge of its distribution as well as that of paper and cardboard manufactured locally. Approximately 220 metric tons of domestic wrapping paper and cardboard were distributed to various Moroccan industries during November 1944.

Reopening of schools in October added another problem but the directors of Economic Affairs and Public Instruction promptly prepared a plan whereby students and teachers could get paper according to their age and the nature of their studies.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending February 17, 1945

STOCKS

	High	Low	Last
A. P. W.	5⅜	5⅛	5⅜
Armstrong Cork Co.	47½	45½	47
Celotex Corp.	17	16⅛	16⅛
Celotex Corp., pf.	20	19¾	19⅞
Certain-Teed Products Corp.	8½	8⅜	8⅜
Certain-Teed Products Corp., pf.	148¾	147½	147¾
Champion Paper & Fibre Co.	35¼	33½	34¾
Champion Paper & Fibre Co., pf.	115¼	113	115
Congoleum Nairn Co.	28¾	28	28
Container Corp. of America	30	28½	30
Continental-Diamond Fibre Co.	13	12⅜	12½
Crown-Zellerbach Co.	22⅜	21⅜	22⅛
Crown-Zellerbach Co., pf.	104½	104	104⅛
Dixie Cup Co.	20	19	19
Dixie Cup Co.,—A	48½	48¼	48½
Flintkote Co.	29⅜	27⅞	28⅛
Flintkote Co., pf.	110	110	110
Robert Gair	6¼	6	6⅛
Robert Gair, pf.	17½	17⅛	17⅜
International Paper Co.	22⅛	21	22⅛
International Paper Co., pf.	91	89¼	91
Johns-Manville Corp.	113	109	112½
Johns-Manville Corp., pf.	...	...	...
Kimberly-Clark Corp.	45¾	42¾	45⅛
Mac Andrews & Forbes	31½	31	31
Mac Andrews & Forbes, pf.	148½	148½	148½
Masonite Corp.	44¼	43⅜	43¾
Mead Corp.	14½	13¾	14
Mead Corp., pf. A—6%	102½	102½	102½
Mead Corp., pf. B—5½%	97	97	97
National Container Corp.	14¼	13⅞	14
Paraffine Companies, Inc.	60¼	60	60
Paraffine Companies, Inc., pf.	109	109	109
Rayonier, Inc.	19⅜	18⅜	19⅜
Rayonier, Inc., pf.	35¾	35	35½
Ruberoid Co.	38½	37½	37¾
Scott Paper Co.	43½	43	43
Scott Paper Co., pf.	109	109	109
Sutherland Paper Co.	34½	33½	34
Union Bag & Paper Corp.	15⅞	14⅞	15⅞
United Paperboard Co.	7⅝	7¼	7½
U. S. Gypsum Co.	86	82	84½
U. S. Gypsum Co., pf.	...	...	...
West Virginia Pulp & Paper Co.	26⅜	25¼	26⅛
West Virginia Pulp & Paper Co., pf.	109½	109½	109½

BONDS

Abitibi Pulp & Paper Co. 5s '53	102½	101	102½
Celotex Corp. 3¾s '55	103¾	103¾	103¾
Certain-Teed Products Corp. 5½s '48	103½	103	103
Champion Paper & Fibre Co. 4¾s '50	...	...	...
International Paper Co. 6s '55	109½	109	109
International Paper Co. 5s '47	104¾	104¾	104¾
Mead Corp. 3½s '53	...	...	...
West Virginia Pulp & Paper Co. 3s '54	...	...	...

New York Curb Exchange

High, Low and Last for Week Ending February 17, 1945

STOCKS

	High	Low	Last
Great Northern Paper Co.	...	...	...
Hummel-Ross Fibre Corp.	8¼	7¾	8⅛
St. Regis Paper Co.	7	6¾	6¾
St. Regis Paper Co., pf.	...	...	...
Taggart Corp.	6¼	6¼	6¼

BONDS

American Writing Paper Co. 6s '61	101	101	101

Robert Gair Pays 30 Cent Dividend

At a meeting of the board of directors of Robert Gair Company, Inc., held on February 16, 1945, a quarterly dividend of thirty cents per share in respect of the first quarter of the year 1945 was declared on the preferred stock of the part value of $20 per share of the company, payable April 2, 1945 to stockholders of record at the close of business on March 9, 1945 without the closing of the transfer books.

At the same meeting, the board of directors declared the full 6% interest on Robert Gair Company, Inc. Income Notes, 1972, payable April 1, 1945 to the holders of record at the close of business March 31, 1945.

Keyes Fibre Co. Nets $289,246

Keyes Fibre Company reports as follows for 1944: Net income, $289,246, against $203,467 in 1943.

Maclaren Shows Rise in Earning

The annual report of the Maclaren Power and Paper Company for the year ended November 30, 1944, showed a rise in earnings as a result of an expansion in the paper subsidiary's results.

Before tax provision, the consolidated net profit was $1,903,143 against $1,724,075 in the preceding year. Taxes absorbed $1,059,500 against $1,027,000, leaving net profit of $843,643 against $697,075, equal to $1.68 a share against $1.39 on 500,000 no-par-value shares on which dividends totalling $1 a share a year are being paid. These earnings are exclusive of refundable portion of tax, which apparently equalled 13 cents a share in the latest year.

The company's strong working capital position was further enhanced, net working capital rising more than $1,500,000 to $5,789,015. A notable increase in current assets was in holdings of Government bonds which rose to $4,736,100 from $2,784,850.

The paper subsidiary, The James Maclaren Company Limited, shows sales of $3,938,115 in the latest year, against $3,683,678 in 1943. Profit before income tax was $1,203,815 against $991,810. Tax provision was $751,500 against $707,000, and net profit was $452,316 against $284,810.

The other subsidiary, Maclaren-Quebec Power Company, shows power sales of $2,532,343 against $2,623,028. Net before income taxes was $699,327 against $732,265, and net profit was $391,327 against $412,265.

Michigan Carton Co. Elects Officers

Directors and officers of the Michigan Carton Company, Battle Creek, Mich., were reelected at the firm's annual meeting held recently. The directors who retained their offices are L. G. Fell, Horace F. Conklin, Marvin Jones, H. J. Byrne, Frank H. Stowitts, E. M. Jenkins and Brainard S. Sabin. The officers renamed are Mr. Fell, president; Mr. Conklin, vice president; Mr. Stowitts, secretary; Mr. Byrne, treasurer; Wilbur C. Ingerson, assistant treasurer, and Miss Janet A. Brouwers, assistant secretary.

Hummel-Ross Nets $374,106

The Hummel-Ross Fibre Corporation reports as follows for the fifty-three weeks to December 30: Net profit, $374,106 or 85 cents a common share, against $394,865 or 90 cents a common share for fifty-two weeks to December 25, 1943. Renegotiation for 1943 has been completed at net cost of $10,124 and company believes that net cost of renegotiation for 1944 will not materially affect earnings reported.

Canada Paper Co. to Redeem Bonds

The Canada Paper Company, of Windsor Mills, Que., has given notice of redemption of the company's first mortgage serial bonds 3½%, Series "A," and of the first mortgage 15-year bonds 4¼%, series "A," the former at 101% and the latter at 102%, with interest in each case.

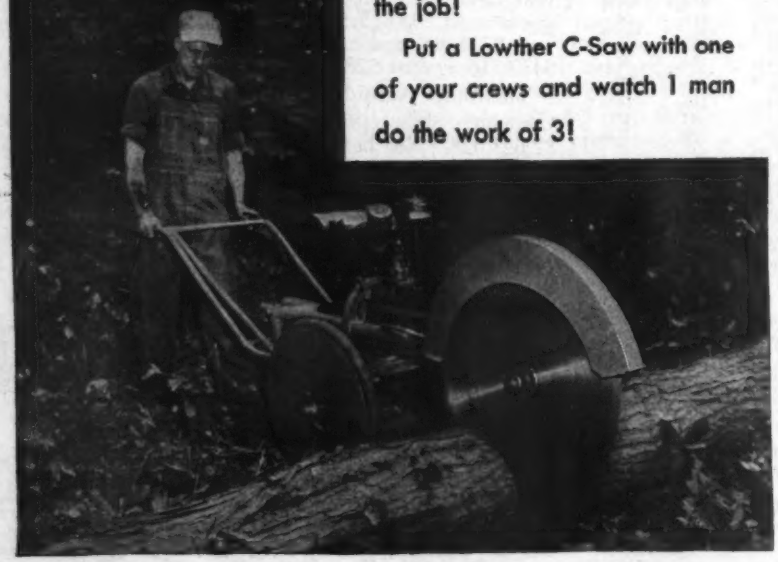
Bird & Son Net $1.20 for 1944

Bird & Son, Inc., reports for 1944 consolidated net profit of $786,572 after all charges, including federal taxes of $954,700, equal, after preferred dividends, to $1.20 a share. This compares with 1943 net of $835,836, after federal taxes of $722,500.

HIRE 1 MAN
AND BUY THE OTHER 3

Right now, in the woods near you, the Lowther C-Saw is felling, bucking and clearing—multiplying some crew's output by three. This means lower production costs! And that's not all; men like to use the Lowther C-Saw. It gets men working and keeps them on the job!

Put a Lowther C-Saw with one of your crews and watch 1 man do the work of 3!



HARRY A. LOWTHER COMPANY, 141 W. JACKSON BLVD., CHICAGO 4, ILLINOIS

Send me circular 74 that shows me how to triple my output.

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Address_____

Await War's End

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, IND., February 19, 1945—It is doubtful if military strategists are watching the developments of the war in Europe more closely than paper men in Indiana, even though the former doubtless know more about the war trends. The paper trade is vitally interested because it believes that with the end of hostilities in Europe there will be some improvement in the supply situation for civilian needs. In the meantime the trade is not expecting much change in the general situation for the first half of this year at least.

With spring just around the corner, the building trades are expecting to have more business than a year ago. Permission already has been granted in several highly war industrial localities for construction of medium priced houses and the demand for building paper and roofing likely will be a trifle better than at the same time a year ago. Stocks in wholesale warehouses are fair and expected to be ample to supply the demand.

Demand for newsprint continued up to quota proportions and as an indication of the general trend, the *Indianapolis Star* last week had a fire in its paper storage department. For three or four days the paper came out each day with a lot of its edges singed. This would not have been the case if paper were more plentiful. Tissue demand continued heavy with some items difficult to obtain. The jobbers of summer specialties, which will be in demand before long, are much worried over the situation. Paper plates, forks and spoons, to say nothing of napkins and towels are virtually off the market here.

Wrapping paper and bags continued to be wanted and the supply continued scarce. All prices were at ceiling levels and the merchants continued to make every effort to get customers to bring their own containers.

A Long-Lived Belt

Nine major repairs and numerous cover patches, all caused by accidents, have been undergone by an endless cord conveyor belt used for the sorting of pulp logs during the last five years, and the belt is still giving satisfactory service, one of the largest paper mills in Texas reports to The B. F. Goodrich Company.

Of five ply construction, 66 inches wide and 130 feet long, the belt operates in the open and only recently a temporary roof has been erected over it to protect it from the sun. Pulp wood logs leave the barking drum by gravity and drop from two to eight feet onto the belt. Logs range from a few inches in diameter to 21 inches and four and five foot in length. Operators armed with axes and sorting picks walk on the belt while sorting the logs.

Colombia's Paper Imports

From the pattern of Colombia's paper and cardboard imports over a period of eight years (1936 to 1943), the ratio between actual volume and value of such imports, some pertinent factors can be cited, says a report to the Department of Commerce. If 1936 can be considered a fair base year—in that twelve months period a total of 18,710,105 gross kilograms of paper and cardboard valued at 3,108,838 pesos were imported—imports since that time have shown wide departures between relative volume and value, amounting to more than 170 percent in 1943. Any one or a combination of several factors could be responsible; 1—either the general price level of paper and board has increased tremendously or; 2—Colombia is now importing paper and board of a much higher quality or; 3—the cost of freight, insurance, etc., has risen appreciably.

To Build Forty Homes

Final plans have now been completed by the Powell River Company for the construction of 40 new homes in the old orchard subdivision at Cranberry Lake, near Powell River, B. C. The houses will be offered for sale by the company to its employees under terms of the National Housing Act.

The company reveals that the proceeding with the project will depend on the possibility of the entire group of homes being purchased, and it has appointed John McIntyre its public relations officer to contact prospective purchasers at the Central Administrative Building in order to determine the amount of interest shown in the scheme.

The houses are of three different designs. Design A has a floor area of 868 feet, is a 4-room house. Bedrooms are 11 by 11 and 12 by 14; kitchen is 9.5 by 16, living room 11 by 17.5. A 6 by 7 entrance hall is provided.

Design B has 850 feet floor space, with provision for addition of two upstairs rooms, 10 by 11.5 and 10 by 13. On the main floor the bedrooms are 9 by 10.5 and 11.5 by 13; the kitchen is 9.5 by 16, and the living room 13.5 by 14.

Design C has 840 feet of floor area; bedrooms are 9 by 10.5 and 11.6 by 13; the kitchen is 9.5 by 16 and living room 11.5 by 19.

The interior finish is plaster, while in one of the designs the upstairs room is framed in the rough, as is also the stairway. Basements are not planned but tests prove that the nature of the soil provides for later installation with a minimum of difficulty.

Prices range from $4,500 to $4,800, which includes a 66 by 150 lot, value estimated at $300 or over.

The subdivision has been incorporated into Cranberry Lake village, and light and water service will be provided by the Cranberry Waterworks District, which is in process of floating a $15,000 loan for the purpose.

Terms of sale under the government act provide for a minimum cash payment of 10 percent, with up to 20 years to pay the balance.

Purchase prices offered by the company include the price of the lots on which the home is to be built.

Packing for South Pacific

Because of the torrential rains and high humidity prevalent over a large part of the South Pacific theater of operations, the Quartermaster Corps is providing an additional waterproof barrier in packing "K" rations destined for that area.

Beginning with the first quarter of 1945, a substantial portion of "K" rations, produced by approximately 50 per cent of the packers, will incorporate an additional water and moisture vapor barrier between the outer case and the packaged rations. The barrier is in the form of a triplex asphalt-impregnated bag designed to fit snugly into the outer case. When deliveries to troops will begin will depend upon the stocks already in the supply "pipe line" on the way to the various theatres.

This material has been used for other purposes and has proved highly satisfactory under the most rigorous conditions. It is now available in sufficient quantities to permit its use for the additional protection of "K" rations.

The material being used is crepe and is flexible in two directions. The closure is also waterproof; the ends of the bag on the inside being coated with an adhesive that seals under pressure, and which presents no difficulty in the packing.

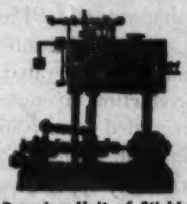
Under the climatic conditions met in the South Pacific, the added barrier will substantially increase the life and efficiency of the "K" ration containers.

STICKLE DRAINAGE AND CONTROL

INCREASES BOILER CAPACITY —SAVES FUEL*

• Carrying forward operations at increased tempo under the difficulties imposed by wartime restrictions has added tremendous significance to advantages supplied by such equipment as the Stickle Boiler Return System.

The increased boiler capacity it makes possible has been especially desirable since greater than maximum capacity often has been required. The decrease in boiler fuel consumption it affords has stood out in bolder relief in a period when even one less car of coal is of great importance to an overburdened transportation system.



Pumping Unit of Stickle Boiler Return System

Many paper mills as well as manufacturing plants in other types of industry using steam for processing purposes have long been enjoying the economy and the improved production advantage of the Stickle Boiler Return System. Combined with Stickle Differential Drainage, the system returns all condensate from dryers to boilers or feed water heater, under pressure, at maximum temperature. In other words there is only a slight differential between the temperature of condensate returned to boilers with the Stickle Boiler Return System and of the steam at operating pressure. The B.T.U. loss incurred in discharging condensate to atmosphere is avoided.

B.T.U.'s put back into boilers in condensate lower the generating load of boilers. Every extra degree of temperature in boiler feed supply reduces boiler fuel consumption. The saving of fuel and increase in boiler capacity are in direct ratio, and while it varies in individual plants according to operating conditions, the average for paper mill installations has been close to 20 percent.

Results are so positive that minimum advantages can be calculated for any installation in advance—and guaranteed as actual minimum results. Complete information for present essential plant improvement or post war planning supplied on request.

* This is one of many advantages that has made Stickle Drainage and Control System the choice of the paper industry. Among other advantages offered by the complete Stickle System are: Correct Drainage at all pressures; Stabilized Steam Flow; Close Control of Moisture Content; Uniform Drying at a pre-determined moisture content; Visible Operation of each syphon; Improved Quality of product; Economy of Steam—greater tonnage in ratio to steam used; and Higher Production Capacity—increased speed of machines.

You should have a copy of the new Stickle Bulletin for Paper Mills now practically ready for mailing. Ask for it.

Stickle

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FOR 40 YEARS REDUCING STEAM COSTS IN PAPER MILLS

PAPER
TRADE JOURNAL
Title Reg. U. S. Pat. Off.
Henry J. Berger, Editor

THE YEAR IN PAPER

Paper production in 1944 totaled an estimated 17,184,000 tons, against a capacity of 19,260,000 tons and the industry operated at a ratio of 89% for the year. This compares with an output of 17,035,688 tons in 1943, with a ratio of 80%, and with 17,083,862 tons in 1942, at an operating ratio of 91%. In the record year of 1941, total production reached 17,762,365 tons and the industry operated at 96% of capacity. The 1944 production of newsprint at 720,752 tons is the lowest recorded in forty-five years. Shipping sack, special industrial, sanitary, absorbent and building papers were the only types of paper for which the 1944 output exceeded 1943. The production of all other kinds of paper was slightly less in 1944 than in 1943.

Newsprint output in North America in 1944 aggregated 3,984,000 tons or 1% less than in 1943. Of this total Canada produced 75%, The United States 18% and Newfoundland 7%. The newsprint total in Canada ranked 6% below the five-year average of 3,175,000 tons for 1939-43. During that period Newfoundland mills averaged 303,000 tons, thus last year's output was 10% under the recent average. The United States output was the lowest in any year since 1900. Canadian exports were 94% of production and totaled 2,813,000 tons, which was 3,000 tons less than exported in 1943. Exports from Newfoundland were 7,000 tons more in 1944 than in 1943. The shifts in destinations of shipments last year resulted in a decrease of 120,000 tons to the U. S., or 2,430,000 tons, compared with 2,550,000 tons in 1943. Exports from the U. S. were static at 15,000 tons. Total imports into the U. S. was estimated at 2,530,000 tons; consumption declined 14% under 1943 and the per capita consumption dropped to 47.1 pounds, compared to the all-time high of 59.3 pounds per capita in 1937. Publishers stocks declined 24,000 tons in 1944 below 1943. At the close of 1944, publishers had a comfortable supply amounting to 52 days' consumption at the current rate.

Kraft paper production in 1944 increased 1% over 1943, with mills operating at 75% of capacity. The total production of coarse wrapping, converting and bag paper, for 1944, estimated by the Bureau of the Census, was 1,922,326 tons, compared with 1,946,908 tons in 1943, and with 2,175,250 tons in 1942, which year includes cup stock, later classified as folding boxboard. Price control on all grades of kraft papers was completely maintained in 1944, through OPA regulations MPR-129 and MPR-182, the former being completely revised and reissued as MPR-129 in June, 1944. The principal change was in the pricing formula of new grades of paper. OPA amendment to MPR-182, issued in January, raised the base weight on wrapping paper from 30 pounds to 40 pounds. This enabled the industry to recover a portion of its higher costs on paper lighter than 40 pounds and made a larger quantity of these lighter weight papers available at a saving in fiber. The outlook indicates demand for kraft paper will be in excess of supply. The end of the war in Europe would probably mean a rapid increase in kraft paper production, as the first probable result would be more manpower made available for cutting pulpwood.

Book paper production of the uncoated grades, was estimated at 1,443,000 tons in 1944, against a capacity of 1,800,000 tons and an operating ratio of 80%. In 1943, the output of uncoated book paper totaled 1,602,878 tons, against a capacity of 1,850,000 tons, and an operating ratio of 87%. In the record year of 1941, actual production totaled 2,025,891 tons, against a capacity of 2,045,000 tons and the operating ratio was 99%.

Writing paper production in 1944 totaled 791,000 tons against a capacity of 860,000 tons and the operating ratio was 92% of capacity. This compares with an output of 830,046 tons in 1943, and against a capacity of 860,000 tons, when operations averaged 97% of capacity. Production of other fine papers aggregated 176,000 tons in 1944, against a capacity of 200,000 tons and the operating ratio was 88%. This compares with 180,555 tons, against a capacity of 200,000 tons, and an operating ratio of 90% in 1943.

Paper board production in 1944 was estimated at 7,810,000 tons, compared with 7,570,000 tons in 1943, an increase of 3.2%. This is within 28,000 tons of the all-time high record output of 7,838,000 tons in 1941. The estimated comparison of the total paper board production with the all-over paper output indicates paper board represented 52.2% of the entire United States production and paper 47.6%. The heavy demand for paper board in the war effort resulted in the highest backlog of unfilled orders on record. This had risen to 655,000 tons on March 11, or equivalent to 25.2 days of operations. Production reached its highest level in the second quarter of 1944, when the total was 156,100 tons. This included 82,300 tons of container, 34,600 tons of folding, 11,500 tons of set-up, and 27,700 tons of all other paper board. The percentages of these major grades was as follows: container, 52.6%; folding, 22.4%; set-up, 7.2%, and all other paper board, 17.8.

Wood pulp production in the United States, as estimated by the Bureau of the Census, totaled 10,612,772 tons, compared with 9,657,914 tons in 1943. Canadian production reached an estimated 5,070,000 tons, compared with 5,152,905 tons in 1943. Imports totaled 1,960,000 tons, compared with 1,252,000 tons in 1943. Exports totaled 184,000 tons,

compared with 263,000 tons in 1943. United States consumption was estimated at 10,259,000 tons.

Pulpwood receipts in the United States totaled 16,168,000 cords for 1944 as compiled by the industry while the WPB figures are 16,465,800 cords for 1944. Domestic receipts were 13% higher than in 1943. For 1945 the WPB has set a goal of 16,000,000 cords for domestic production and receipts, or an increase of about 100,000 cords monthly this year.

Handling of Discharged Veterans

Proper handling of discharged veterans on their return to civilian jobs in industry is a supervisory problem that foremen and department heads must learn now, Allan R. Cullimore, president of the Newark College of Engineering, has warned industry in the current special issue of *Management Information*, "How to Handle Our Returning Veterans."

"In spite of all that management can do in placing these men, the burden of working out their salvation is going to lie chiefly with the supervisor," he says, "and he ought to understand pretty definitely a few of the simple things that lie back of success in handling them."

"The key to effective readjustment of the returned veteran," Mr. Cullimore states, "is to supervise him the same as you would any other man. The supervisor must remember to let the veteran help himself. He must realize that the supervisor's job is to supervise, which means to indicate to an individual how he can be more productive for his own good and that of the company."

A complimentary copy of the special issue of *Management Information*, "How to Handle Our Returning Veterans," will be furnished to any company executive on request to the publishers, Elliott Service Company, 219 East 44th street, Department P-1, New York 17, New York.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1945		Corresponding Weeks—1944	
Jan. 6	81.0	Jan. 8	90.2
Jan. 13	88.7	Jan. 15	89.5
Jan. 20	87.1	Jan. 22	86.1
Jan. 27	88.4	Jan. 29	89.1
Feb. 3	88.8	Feb. 5	88.4
Feb. 10	*90.1*	Feb. 12	88.8

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1944	88.7	88.5	88.1	87.6	88.7	89.8	80.3	90.6	90.1	92.5	90.6	82.4	88.1
1945	*86.7*												

COMPARATIVE YEARLY SUMMARIES

	1938	1939	1940	1941	1942	1943	1944	1945
Year to Date	64.5	77%	88.7	86.5	104.1	87.4	88.7	*87.0*
Year Average	71.5	83.4	85.6	97.4	90.4	87.8	88.1	

*Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS†

Current Weeks—1945		Corresponding Weeks—1944	
Jan. 6	80	Jan. 8	86
Jan. 13	95	Jan. 15	93
Jan. 20	94	Jan. 22	93
Jan. 27	93	Jan. 29	95
Feb. 3	92	Feb. 5	97
Feb. 10	*93*	Feb. 12	97

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1944	90	96	95	96	96	96	85	96	92	95	95	85	93
1945	*91*												

†Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

PULP AND PAPER

LYDDON & COMPANY (AMERICA) INC.

EXPORTERS OF WOOD PULP TO BRITAIN, SOUTH AMERICA AND ALL OTHER WORLD MARKETS

PARSONS AND WHITTEMORE INCORPORATED

WOOD PULP

WORLD-WIDE PAPER EXPORTERS

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. . . build more profit
. . . for YOU

1. Marathon products are exceptional in their "merchandising" appeal to the markets they serve.
2. Their markets are thriving and progressive, active potential users and consistent "repeat" buyers.
3. Marathon products are distributed under a sound and definite sales policy.
4. Marathon products are backed by an alert and enterprising sales organization and consistent advertising help.

MARATHON CORPORATION
(Formerly The Menasha Products Co.)
MENASHA, WISCONSIN

* The trade name Menasha has been changed to Marathon.

STRETCH MAN HOURS

with JOHNSON Rotary Pressure Joints

WHEN you're looking for ways to ease today's "Help Wanted" problem, it will pay to check into your stuffing boxes or steam fits. They demand a lot of care and attention—for inspecting, servicing and, too frequently, for replacing parts worn rapidly by misalignment.

With Johnson Rotary Pressure Joints you save these precious hours of labor for more productive work, because the Johnson Joint is completely packless, self-oiling, self-adjusting and even self-aligning. You save also the production time that is wasted when machines are shut down for stuffing box repair. And with the Johnson Joint you have a simpler, easier way to provide modern, more efficient methods of syphon roll drainage.

For today's big task these production boosting benefits of the Johnson Joint are of first importance. Don't overlook, however, the savings in dollars and cents—in reduced maintenance and longer life—which can quickly pay the cost of change-over. Make that your final reason for joining the hundreds of Johnson Joint users.

TODAY'S WAY TO SAVE TIME AND TROUBLE

● Nipple (1) fastened to roll. Sliding collar (2) keyed to nipple. Carbon graphite seal ring (3) and bearing ring (4) which eliminate oiling and packing. Spring (5) is for initial seating only; joint is actually pressure sealed when in operation.

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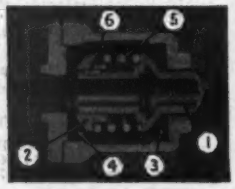

KNOW THE JOHNSON ELECTRAP

Today's highest development in a trap for pumping or lifting service, and for draining vacuum lines under vacuum as complete as 27" of mercury. Electric control makes operation as dependable as flow of electricity; there are no floats or stuffing boxes—no moving parts of any kind on trap chamber. Control valve gear is one compact assembly—can be mounted in any convenient location if trap chamber must be set in inaccessible position. Ask for bulletin.

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PAPER MILL OPERATORS!

Are you interested in—

CONTROLLED PARTICLE SIZE AND SETTLING RATES FOR LIME, BY METHOD OF REBURNING AND SLAKING?

Write us making appointment to have a talk with our engineer.

TRAYLOR ENGINEERING & MANUFACTURING CO.

ALLENTOWN, PENNA., U. S. A.

WRIGHT-HIBBARD

INDUSTRIAL ELECTRIC TRUCK CO.

INCORPORATED

Phelps, New York

Platform size 24 x 42 x 11" high, low position; 15" high when elevated. Capacity: 2000, 3000, and 4000 pounds.

Capacity 2000 lbs. on forks 30" long. Truck turns from a 5' aisle into an intersecting aisle of 5'.

Weight of 4000 lbs. capacity—2850, without battery. Truck turns from a 5' 4" aisle into an intersecting aisle of 4'.

Platform 24" wide, 33" long and 11" high, low position. Capacity 2000, 3000 and 4000 pounds.

The Wright-Hibbard Telescoping high lift truck is designed to operate in the most congested areas of factories and warehouses. The exceptionally narrow width and short overall length found in other Wright-Hibbard trucks are retained in this model.

Platform 24" wide, 42" long and 9" high, low position. Weight of 4000 lb. capacity—3300 without battery.

PALMETTO *Plastic* PACKING

- Exceptional anti-friction properties . . . becomes a smooth, bearing-like sleeve in service.
- Completely malleable—may be hammered or rolled to fit any size stuffing box.
- Longest-fibre asbestos for extra strength and longer life.
- Wide usefulness . . . a general purpose packing for industrial, mining, railroad, marine services.

This Palmetto Packing has ultra-high resistance to friction and heat. It does not dry out or harden—no liquid lubricant to be squeezed out or melted.

Derives its lubricating properties from graphite and soft flakes of anti-friction bearing metal, which form a wearing surface of low friction.

Wherever Plastic Metallic Packings are to be used, you can be SURE of best results with PALMETTO . . . available NOW for prompt shipment.

PROMPT DELIVERIES

Coil Form Now Ready

USED FOR
Centrifugal Pumps
Rotary Pumps
Valves of All Types
Steam Apparatus
Chemical Apparatus
Chemical Equipment

PACKS
Steam
Air
Water
Gases
Mild Chemicals

Supplied in square shape, coil form. Order from your local Greene, Tweed distributor, or, if necessary, direct from us.

GREENE, TWEED & CO.

Bronx Boulevard at 239th Street, New York 66, N. Y. Plants at New York, N. Y., and North Wales, Pennsylvania

PALMETTO

Self-Lubricating PACKINGS

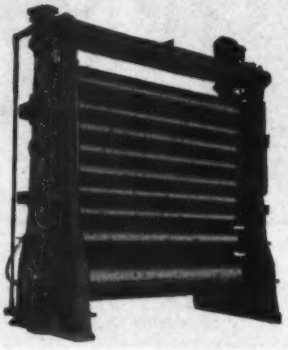
PALMETTO for steam, water, air. PELRO for oils. CUTNO for alkalis. SUPERCUTNO (blue asbestos) for acids. KLERO for foods.

PAPER MILL *Machinery*

Lobdell stands ready with the solution of replacement problems with which so many paper mills are face to face today. Well worn equipment will not meet the demands of the rush of orders which will be released when relaxed regulations permit the replenishment of almost exhausted paper stocks.

The design and performance of Lobdell paper mill machinery reflect a background of more than a century of experience . . . a fact to be considered by mills when purchasing machinery for post war expansion.

GET TOP PERFORMANCE WITH LOBDELL CALENDER STACKS



Lobdell Calender stacks are accurate, durable and easily operated. Roll lifts, controlled from the floor, may be actuated by electric motor, hydraulic power or hand ratchet. Up-to-the-minute automatic lubrication or anti-friction bearing equipment is employed as service indicates.

LOBDELL ROLL GRINDERS
FEED AND GRIND *AUTOMATICALLY*

Lobdell patented the automatic crowning device, an improvement which has rendered faithful service to the paper industry for over 40 years. It grinds a perfect crown of any size on any length roll.

The new automatic grinding wheel in-feed adjusted instantly for maximum and minimum cutting requirements, entirely eliminates the need for continual attention by the operator.

The in-feed, operated by just a half turn of a knurled knob, delivers continued wheel pressure on the roll. It can be installed on any Lobdell grinding machine, now equipped with the Lobdell crowning device.

MICROMETER ROLL CALIPER

Indispensable in keeping check on regrinding of rolls. Extremely accurate, light in weight and easily adjusted to varying roll diameter; 7" to 30", 8" to 36" and 9" to 42".

"PURALOY" CHILLED CALENDER ROLLS

Made of an exclusive Lobdell developed alloy, having extra hardness and corrosion resistance to meet the added severe service of water finish, etc. Alloys used in "Puraloy" rolls are under wartime regulations. Now available in limited quantities.

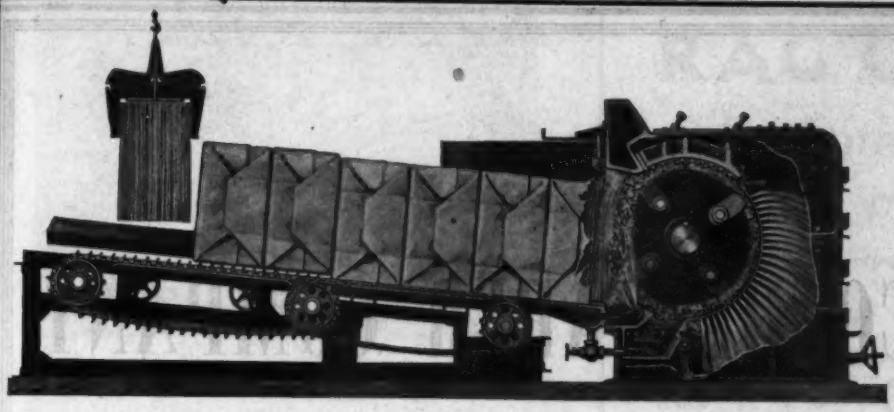
We are interested in your post-war needs . . . and urge you to call upon us for information and consultation. The new Lobdell catalog presents a detailed description of our up-to-date machinery for the paper making and allied industries. Write for a copy today—on your letterhead, please.

LOBDELL

COMPANY ESTAB. 1836 **WILMINGTON 99, DEL.**

Built and sustained upon the rights to FREE, COMPETITIVE PRIVATE ENTERPRISE guaranteed by the Constitution of the United States

Rolls • Calender Stacks • Roll Calipers • New Improved Roll Grinding Machines



Improved

Bale Pulper

TRADE NAME

PROTECTED BY U. S. PAT. 1,910,382 AND FOREIGN PATENTS. OTHER PATENTS PENDING.

STURTEVANT BALE PULPER

for

PULPING

Bales — Rolls — Laps

Discharging at Consistencies for Pumping or Trucking any Desired Tonnage

STURTEVANT MILL CO. HARRISON SQUARE **BOSTON 22, MASS.**

Introducing

THE GREAT NORTHERN — WATEROUS GRINDER

Our energies continue to be devoted to war production but this new design of Grinder is in readiness and we shall be glad to tell you more about it.

Montague Machine Company

Turners Falls, Mass.

The
CHILLICOTHE PAPER COMPANY

CHILLICOTHE, OHIO

Manufacturers of highest quality uncoated book papers, offset paper and papeteries

CHAMPION-INTERNATIONAL COMPANY

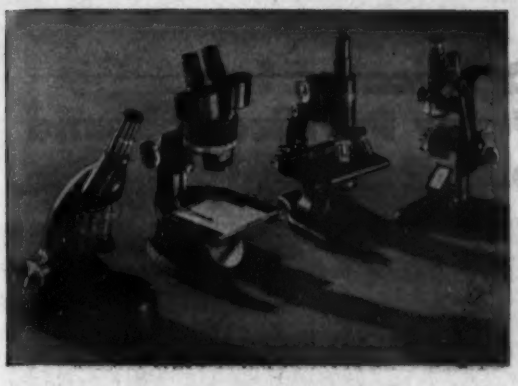
Manufacturers of

Surface Coated Papers
Coated one and two sides
Essex, Prospect, Newfield Coated Book
Capacity 200,000 lbs. 24 hours

We manufacture Coating Stock and Soda Fibre for our own consumption.

Mills and Executive Offices
Lawrence, Mass.

New York Sales Office,
Lincoln Building
60 East 42nd Street



Optical Instruments for the Laboratory

Wartime achievements in research and process control owe much to the optical instruments which extend vision and provide a means of measuring optical characteristics.

The Spencer Colorimeter is designed for convenience. The built-in illuminator and inclined eyepiece permit a comfortable position for the operator. Direct reading drums and separable cups speed up use.

The Stereoscopic Microscope extends human vision, retaining the natural position and movement in manipulating for careful inspection of detailed materials.

The Standard Laboratory Microscope with mechanical stage is easily equipped to provide the various types of illumination and magnification needed in industrial research and process control.

Four different Spencer Refractometers are now being produced for index and dispersion measurements of solids and liquids.

Although the demand on Spencer's facilities for the production of optical equipment for warships, planes, tanks and guns has been great, we have been able to supply many vital war industries with urgently needed, indispensable scientific instruments.

ARMY NAVY

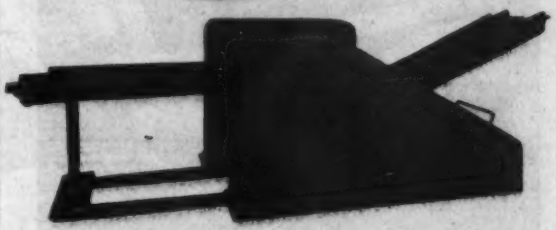
Spencer LENS COMPANY
BUFFALO, NEW YORK
SCIENTIFIC INSTRUMENT DIVISION OF
AMERICAN OPTICAL COMPANY

RAG CUTTERS

for both large and small paper mills

A range of capacity in *Taylor-Stiles Rag Cutters* from one ton an hour to five tons an hour provides for all capacity needs of the mills.

NO. 1 GIANT RAG CUTTER



is a strong, well built machine with one ton capacity, that compares in every way with our big five-tons-an-hour cutters.

NO. 36 GIANT TANDEM RAG CUTTER

is used to cross cut the rags for greater uniformity in the size of cuttings. Its rated capacity is one and one half tons an hour.

Let us know your rag cutting needs.

TAYLOR-STILES and Company
CUTTING MACHINES & KNIVES

10 Bridge Street Riegelsville, N. J.

Where Humidity is High . . .
insure Efficient Transmission

. . . by installing

TANNATE WATERSHED
Leather Belting

In paper and pulp mills, where hot, humid conditions are encountered Tannate Leather Belting maintains a high operating efficiency . . . carries nearly a full load even when damp. Laps and plies won't separate. These advantages result because Tannate is made with waterproof cement and is treated to resist moisture.

Further it is resistant to machine oils and many weak chemicals. It is strong and flexible and has an exceptional pulley grip.

Rhoads Engineering Service has helped many mills with their difficult drives. Let us help you.

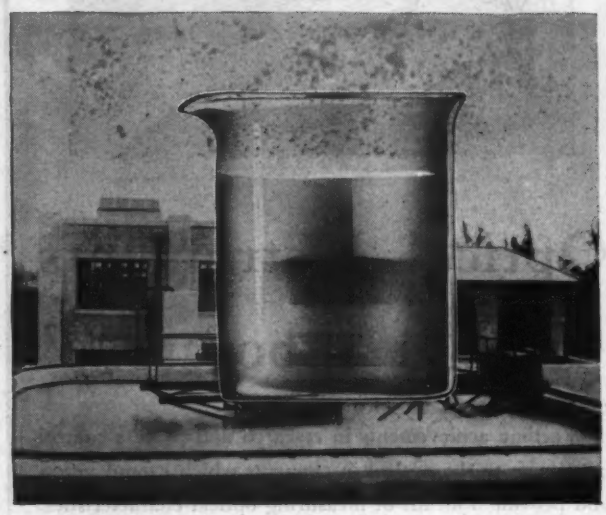
Write for a copy of our helpful pamphlet—
"Better Service Belt Hints"

Rhoads
Tannate
WATERSHED
LEATHER BELTING

J. E. RHOADS & SONS • Est. 1702
35 N. SIXTH ST., PHILA. 6, PA.
NEW YORK · CHICAGO · ATLANTA · CLEVELAND

NEW YORK - CHICAGO - ATLANTA

PQ Silicates for Water Purification and Color Removal



WANT to improve the quality of your water supply? Use PQ Silicates as your coagulant aids.

Silicates when converted into sols increase the rate of growth of the floc, its size, and toughness. Suspended solids are enmeshed in this floc which settles rapidly even in cold water. Thus water is clearer with filter capacity stepped up considerably.

An added advantage for mills producing fine white papers is the improved color removal. This results in lower bleach cost as well as better quality paper.

Our technicians are glad to consult with you on the proper converting procedure for your water supply and to arrange for a test.

Free bulletins are available on request:
No. 52-4 "Water Purification Methods Involving Sodium Silicates"
No. 52-5 "Colloidal Silica As An Aid to Floc Formation"
No. 52-6 "Chart for Preparation of N-Sc. Coagulant Aids."

PQ SILICATES OF SODA

PHILADELPHIA QUARTZ COMPANY
General Offices: Dept. B, 121 S. Third St., Philadelphia 6
Distributors Stocks in over 65 Cities • 9 Mfg. Plants

SOMETHING SEEMS TO BE WRONG.....

The trouble here is pretty obvious . . . the shoe simply wasn't designed for the foot. Misfits, however, aren't always so apparent.

Are you 100% sure, for example, that no felt exists which could perform better on your machine? Simple changes sometimes lead to startling results.

One mill changed specifications and increased felt life 20%. Another added 8% to machine speed. Still another licked a baffling pin hole problem in their sheet. Why not be sure in your case? THE ORR FELT & BLANKET CO., Piqua, Ohio.

ORR FELTS

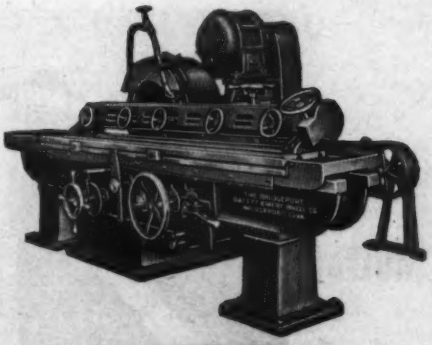
IT'S EASY TO KEEP AHEAD OF *BLADE WEAR*

WITH THIS GRINDER ON THE JOB

"Bridgeport" No. 179 Heavy Duty Knife and Face Grinder is a money and time saver in any sizable paper mill because it services paper, chipper, rag and veneer knives, shear blades and similar tools, on a *production* basis! It's always ahead of the procession!

Any mechanically-minded workman can soon learn to handle it—usually along with his regular work. It functions with various angle bars, knife bars and chucks, including *magnetic*. Extremely rugged in construction, with many features that make for ease in setting up and smooth, accurate operation. The grinding wheel is a "Bridgeport" Improved 26" Sectional, consisting of 12 abrasive sections in a heavy cast steel chuck.

Keep ahead of your grinds! Write for details of No. 179 today.



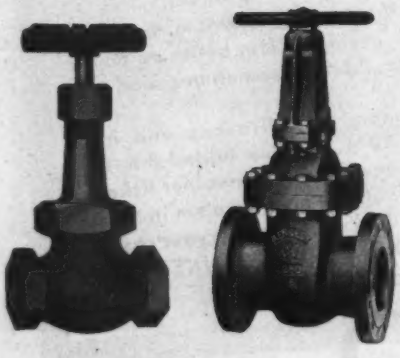
"BRIDGEPORT"
NO. 179—HEAVY DUTY
KNIFE & FACE GRINDER

THE BRIDGEPORT SAFETY EMERY WHEEL CO., INC., BRIDGEPORT, CONN.

Bridgeport

GRINDERS • GRINDING WHEELS • BUFFING LATHES

Sturdy in every part



THICK body walls, heavy flanges, large bolts, and deep stuffing boxes are characteristic of every Kennedy Valve type. Operating mechanisms are simple, strong and positive in operation, stems are of specially tough metal, and handwheels are amply large for easy leverage.

Whether you require valves for low, medium or extra heavy pressures, you will find an exactly suitable Kennedy Valve type which has proven its reliability in many thousands of installations.

THE KENNEDY VALVE MFG. CO. . . . . ELMIRA, N. Y.

KENNEDY

Extra Values in **VALVES** *and* **PIPE FITTINGS**

ALL WELDED
BARKING DRUMS & WOOD WASHERS

DESIGNED FOR LONG USE WITHOUT REPAIRS AND DO NOT BROOM THE WOOD
COMPLETE DETAILS ON REQUEST

CARTHAGE MACHINE COMPANY
ENGINEERS AND BUILDERS OF
PULP AND PAPER MILL MACHINERY
SHREDDERS - GRINDERS - BARKERS - CHIPPERS - PUMPS - WET MACHINES - CHIP SCREENS AND CRUSHERS
WOOD WASHERS - VALVES - AGITATORS - SULPHITE MILL MACHINERY - LEAD and BRONZE WORK SPECIALTY
CARTHAGE NEW YORK

For FIBER BOARD

MAPICO Reds

Several standard shades permit a variety of rich deep reds and pleasing tints ranging through orchid, coral and pink.

Good fiber adhesion, permanent color (light, acid and alkali resistant), high tinting strength and uniformity have made these fine precipitated iron oxides much sought after by paper manufacturers.

Mapico production is now at an all-time peak. If you have difficulty in filling your requirements large demands for war uses are the cause.

Look to MAPICO for Leadership

MAPICO Colors

PURE OXIDES OF IRON

YELLOWS · REDS · BROWNS · BLACK

COLUMBIAN COLLOIDS

ARMY E NAVY

We will gladly send samples and complete technical data.

COLUMBIAN CARBON COMPANY

MAGNETIC PIGMENT DIVISION

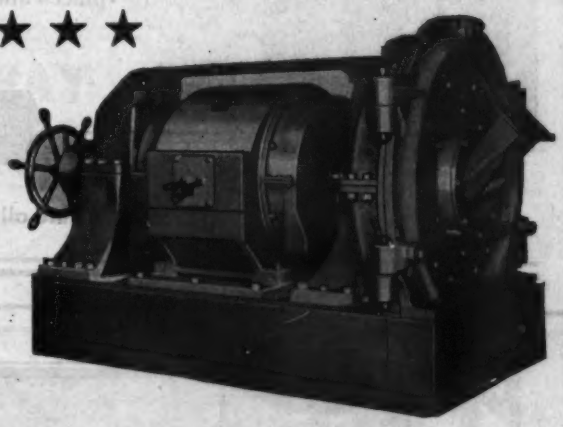
MANUFACTURER

BINNEY & SMITH CO., Distributor

41 EAST 42nd STREET · NEW YORK 17, N. Y.

★★★ 38 Reasons Why A SPROUT-WALDRON TYPE 36-2 ROTARY DISC REFINER

★★★



WILL GIVE YOU

★ A Better Product

★ A Bigger Profit

★ Lower Cost Operation

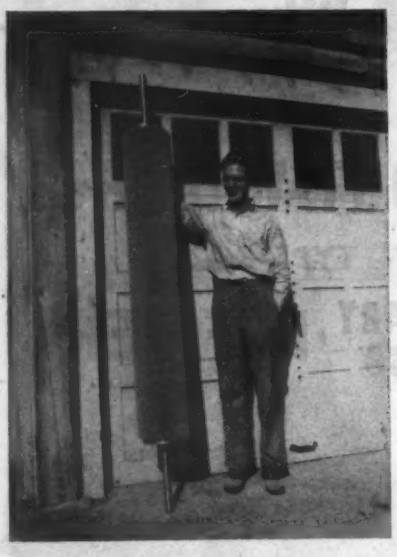
TODAY—WRITE FOR BULLETIN 2200-P-2

SW SPROUT, WALDRON & COMPANY

Manufacturing Engineers Since 1865

24 Waldron Street • Muncy, Pennsylvania

JENKINS' METAL CORE BRUSHES



The brush shown, one of the largest employed in paper making, is 144" long. It is used to sprinkle tissues.

WITH NYLON BRISTLE

Outlast any other brushes made for the paper industry

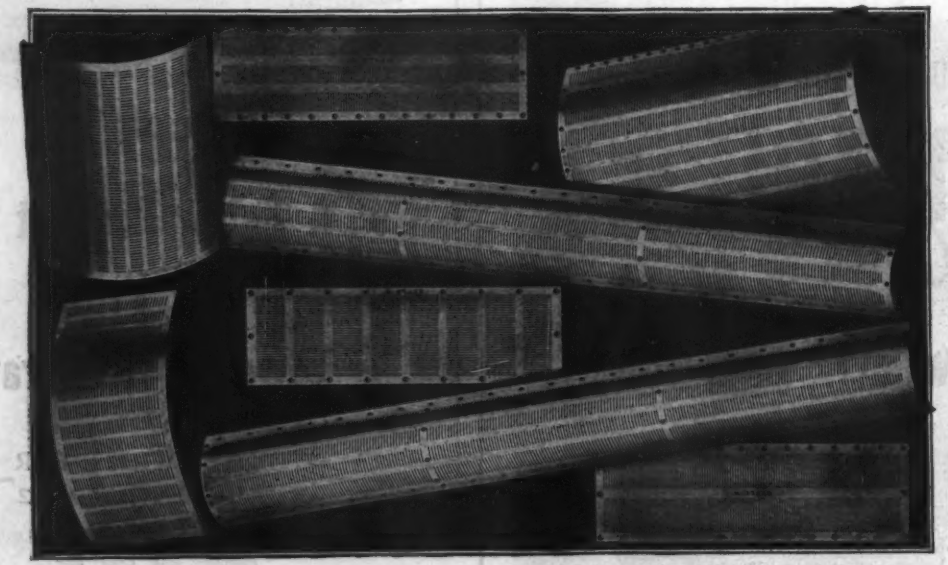
Because the cores of these brushes are made from cold drawn steel or aluminum, they are practically everlasting. They will not sag, warp, crack or split. Precise alignment is assured.

The nylon bristle, wound on the metal cores by a patented process, cannot shed. When worn, the bristle can be replaced and the brush made like new.

Send for particulars

M. W. JENKINS' SONS, INC.
CEDAR GROVE, ESSEX COUNTY, NEW JERSEY

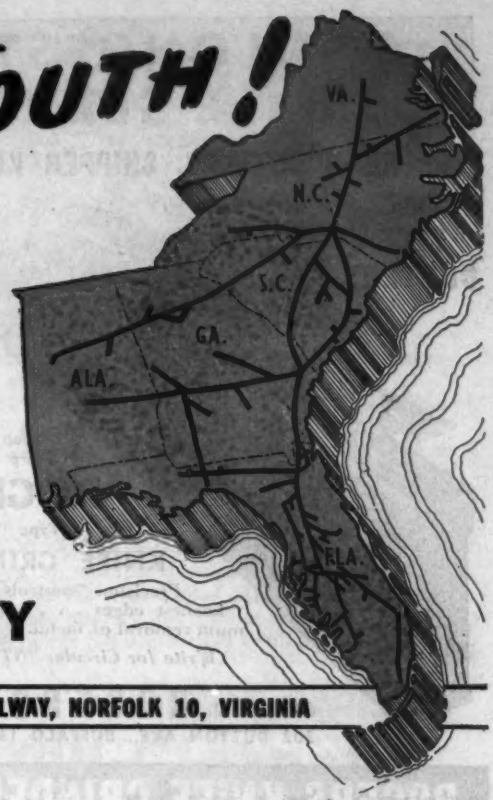
We manufacture all types of Industrial Brushes.



"HARDY" BRONZE and CHROME-NICKEL-STEEL SCREEN PLATES.

MAGNUS METAL CORP. FITCHBURG, MASS.

ACCENT ON THE SOUTH!



Let us supply you information about the South. The Industrial possibilities of this area are the talk of the country. We have studied the territory for years and our experienced staff can assist in selecting the most advantageous location for your plant.

Our services involve no obligation, and all inquiries are held in confidence.

SEABOARD RAILWAY

Write

DALLAS T. DAILY, GENERAL INDUSTRIAL AGENT, SEABOARD RAILWAY, NORFOLK 10, VIRGINIA

ELIXMAN

CAPS

Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

Long draw protected slot caps of heavy gauge steel in all standard sizes.

Heavy duty caps with reenforced square hole. This patented feature of reenforcement gives added strength and durability.

CORES

Samples of caps or cores will be gladly submitted

ELIXMAN PAPER CORE COMPANY, INC.

CORINTH, N. Y.

GET LONGEST POSSIBLE SERVICE

from REAM CUTTERS, CHIPPER KNIVES and STOP CUTTERS

72"
90"
110"
134"

Keep Them Sharp on This

ROGERS

Type "NT"

KNIFE GRINDER

Precision controls assure keenest edges . . . with minimum removal of metal.

Write for Circular "NT".

SAMUEL C. **ROGERS** & CO.
202 DUTTON AVE., BUFFALO 11, N. Y.

ROGERS KNIFE GRINDERS
PRECISION QUALITY SINCE 1887

KOSMOS—DIXIE PARIS BLACKS

Unexcelled carbon black pigments for all types of paper and board stocks.

Outstanding for soft texture, particle fineness, and jet black color.

Best for performance in the Beater and Jordan because of ease of wetting and ready dispersion in the pulp.

Takes well to the fiber and shows high retention.

UNITED CARBON COMPANY, INC.
Charleston, West Virginia
New York Akron Chicago

J. Andersen & Company

21 East 40th Street
NEW YORK

Importers of Pulp

BLEACHED AND UNBLEACHED SULPHITE, KRAFT PULP AND GROUND WOOD

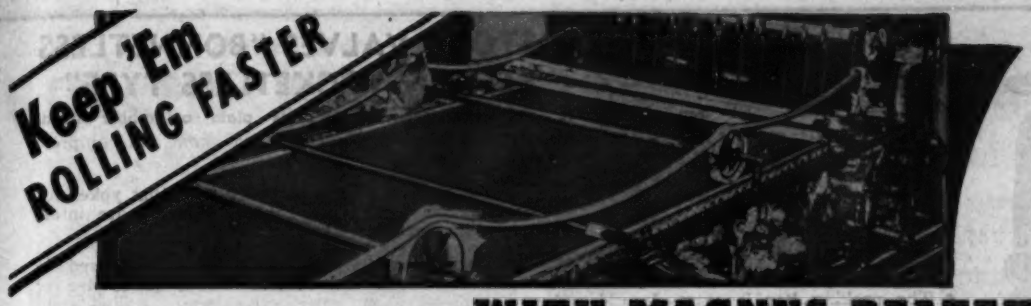
Curtis Paper Company

Paper Makers since 1848

NEWARK • DELAWARE

Utopian Text and Cover
Curtis Text and Cover
Curtis Opaque

Fine Printing and Industrial Papers
Rag and Sulphite Text
Fancy Felt Finish Papers
Detail Drawing
Rag Map
Bristols
Photomount
Absorbent Paper for Impregnating
Papeterie.



WITH MAGNUS BEATEX

When you use Magnus Beatex in the beater, you do quite a number of things that help increase production and help hold the increased rate.

Beatex first of all puts water into your stock faster. Beating time is reduced and there is less work for the jordan.

Beatex also increases retention of short fibres on the wire, boosting yield and improving formation. More size, color and filler are retained in the web. Dewatering of the web on the machine is faster when Beatex is used, because of its effect in reducing the surface tension of the stuff.

Beatex has many other advantages, all covered in detail in the Magnus Paper Mill Handbook, but one other point deserves emphasis here: When Beatex is used it tends to keep the system clean. If you start using Beatex in a clean system, you'll find that you'll have mighty little trouble with production delays due to slime.

Ask us for complete details on Beatex and a copy of the Magnus Paper Mill Cleaning Handbook. Please specify the type of sheets you make, since Beatex is not applicable to all kinds of paper.

MAGNUS CHEMICAL CO. 24 SOUTH AVENUE, GARWOOD, N. J.

Magnus Paper Mill Cleaners

PENNOTEX OIL CORPORATION

29 Broadway
New York, N. Y.

AMORPHOUS WAXES

Melting Points 120° F. to 205° F.

For the Manufacture of

LAMINATING PAPER . . GLASSINES . . WATERPROOFING . . GREASE PROOFING . . EXTENDERS FOR PARAFFIN, FOOD CONTAINERS, CONTAINER LININGS, ADHESIVENESS AND PROTECTIVE COATING.

Tarentum Products Corporation

successor to

Tarentum Paper Mills

Manufacturers of Paper since 1865

Specialists in

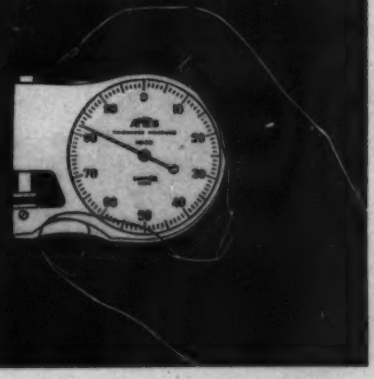
Ham Wrap — Gasket Paper, Die Wipe, Duplex Papers, Multi-Wall Bags — Wallet

Mill & Office
Tarentum, Pa.

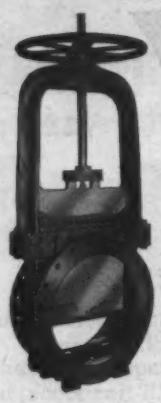
Phone
Tarentum 1470

AMES THICKNESS MEASURE No. 25

The neatest, lowest priced, most accurate and durable dial pocket gauge made. Its case is only ¼" thick, dial diameter 1⅝", yet measurements up to 5/16" can be made by thousandths with great accuracy.



B. C. AMES CO., WALTHAM 54, MASSACHUSETTS, U.S.A.



RECORD PAPER & PULP STOCK VALVES "BONNETLESS SELF CLEARING" — — — "RESIDUE POCKETLESS TYPE"

METALS — I.B.B.M., all iron, bronze or stainless steels, body parts plain or rubber lined.

The photo of 24" Fig. 241 I. B. B. M. valve while illustrating the gate bottom wedge system for forced gate seating and "GUILLOTINE" edge for shearing fibre at seat also shows the packing box and yoke as separate units. Both adjustable.

- The "FAST THREADED" screw stem and ball bearing speeds valve operation.
- The packing box is extra deep, is adjustable and provided with specialized lubricated packings and special type gland and compression bolts.
- The yoke mountings are such that yokes for various methods of gate operation are interchangeable.
- Replaceable gate edge shoes are used in valves 10" and larger. These shoes are of special value when valves are installed stem and pipe horizontal.

"RECORD PRODUCTS EXTENSIVELY USED IN DEFENSE PROJECTS."

RECORD FOUNDRY & MACHINE COMPANY
LIVERMORE FALLS, MAINE, U. S. A.

We Are Looking for Trouble

Often little things mean more work for the machine hand, the superintendent, or the purchasing agent. Does some little thing give trouble on your screens? Write us about it! Or ask to have a *UNION* representative call!

We may be able to help
and we'd sure be glad to try.

UNION SCREEN PLATE COMPANY
FITCHBURG, MASS.
(ASSOCIATED WITH UNION MACHINE CO.)

CLINTON

STARCHES

Special Grades for
Beater, Calender and
Tub Sizing.

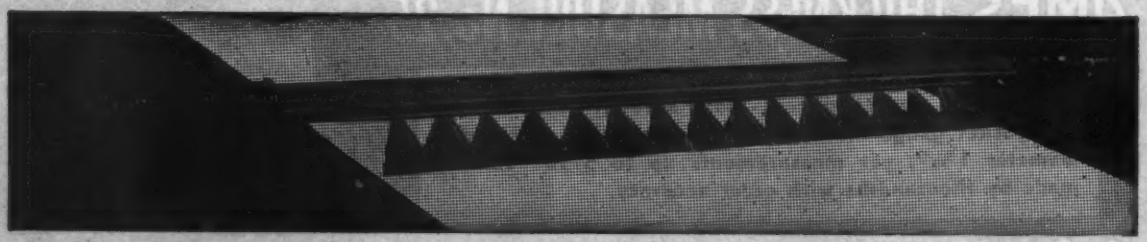
•

QUALITY
UNIFORMITY
SERVICE

•

CLINTON COMPANY
Clinton, Iowa

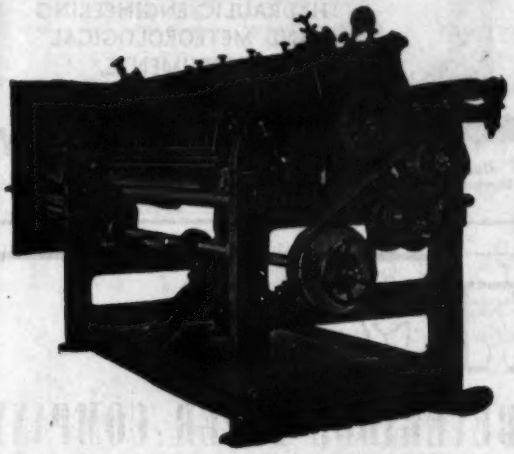
For SHOWER PIPES—*Call Headquarters!!*



Bulletin 134 **SANDUSKY FOUNDRY & MACHINE CO.** Sandusky, Ohio

MODEL 28

ROLLER BEARING CUTTER



HAMBLET MACHINE CO.

LAWRENCE, MASS.

MAKERS OF

SINGLE, DUPLEX AND DIAGONAL PAPER CUTTERS
CUTTER KNIVES, PATENT TOP SLITTERS.

Have COPCO represent you in the Central States.

One hundred and ten salesmen backed by an alert management, with seventy years experience in the territory, will sell your papers through eight modern warehouses strategically situated in four states.

The Central Ohio Paper Co.
Home Office 226 N. 5th St. Columbus 16, O.

Complete operating divisions in Cleveland, Detroit, Columbus, Pittsburgh, Toledo, Indianapolis, Dayton, Charleston
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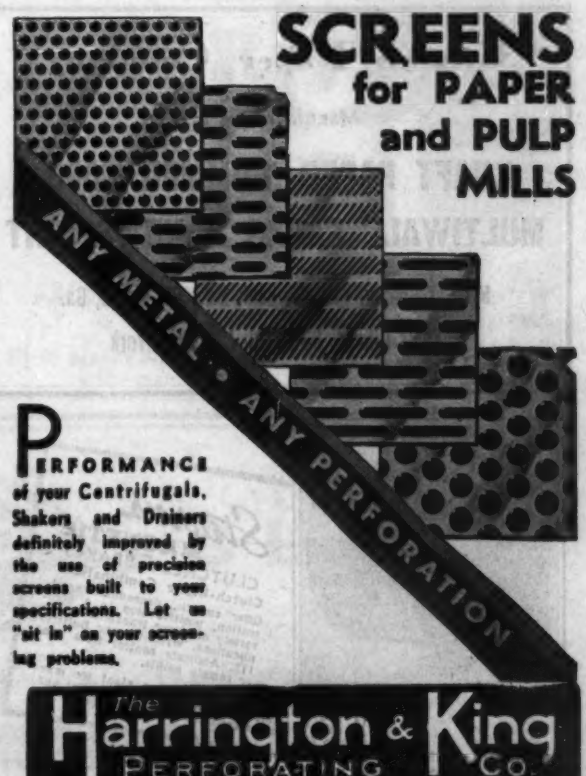

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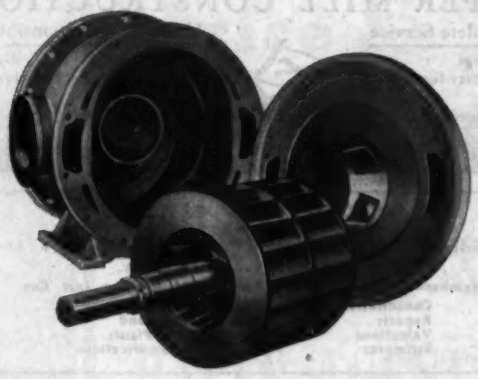

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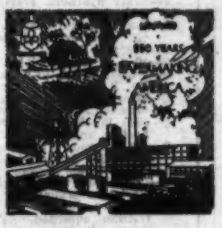

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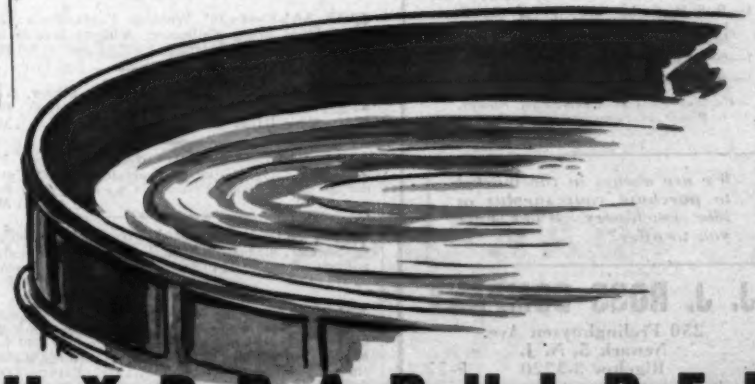

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FOR SALE—4 - 36" Waldron Paper Reels; 36" Waldron Roller Embosser. Address Box 45-104 care Paper Trade Journal. M-1

FOR SALE—65" Moore & White Slitter, with 125 sets of knives shear cut. Address Box 45-105 care Paper Trade Journal. M-1

FOR SALE—4 slightly used Broughton No. S-10-xm Oscillating Showers for 104½" Cylinder Mould. Sonoco Products Co., Hartsville, S.C. M-1

FOR SALE — Standard Meisel Rotary Spot Sheeter, size 36" x 48". For further particulars address Box 45-114 care Paper Trade Journal. F-22

FOR SALE—One six-inch, two stage Warren Pump, with extended base for direct connected motor. 900 gallons per minute. Develops 230 foot head. 1150 RPM. Pump in operation only a short time. Address Box 45-115 care Paper Trade Journal. F-22

FOR SALE

1—Dilts Beater—good shape—Cast Iron Tub—Roll 62" x 54".

Address Box No. 45-119 care Paper Trade Journal. M-1

FOR SALE

New and guaranteed used steel pipe, boiler tubing, valves, fittings, wood and steel tanks, steel buildings

JOS. GREENSPON'S SON PIPE CORP.
NATIONAL STOCK YARDS, Illinois.
M-8

FOR SALE—50" Sheridan New Model Cutter, good working order. Address Box 45-117 care Paper Trade Journal. F-22

FOR SALE—1 Hamilton-Corliss Variable Speed Twin Engine, size of cylinders 12" x 24". Also Triple-Deck Frames for ninety 36" dryers, any width. The Chesapeake Paperboard Co., Baltimore, 30, Md. TF

WANTED

WANTED

One Beater of 1,000 lb. Capacity.

One Jordan—No. 1 or No. 2 Miami or equivalent.

Two Calender Stacks — approximately 100 inch Face.

Give complete description, specifications and price.

FOR SALE

42 Dryers consisting of 36" diameter, 85" and 86" Face, complete with Triple Deck Stands, Gears, Bearings and Piping.

Empire Box Corporation
Garfield, New Jersey
TF

WANTED

WANTED

One (1) Laboratory Beater
Waterbury Hydraulic Drive size 5
11—60" Diameter x 92" Face Dryers
16—48" Diameter x 92" Face Dryers
4—36" Diameter x 92" Face Dryers

with gears, frames, felt rolls and cone pulley drives. Address Box 44-708 care Paper Trade Journal. TF

WANTED TO BUY — One Yankee Dryer, approximately 84" in width, from 84 to 120" in diameter. Address Box 45-64 care Paper Trade Journal. F-22

WANTED—Brightwood Box Machine. Address Box 44-836 care Paper Trade Journal. tf

WANTED

WANTED

CALENDER STOCK—10" INTERMEDIATE ROLL MINIMUM
ALSO
SHEETER—SINGLE OR DOUBLE CUT-OFF BOTH FOR 72" MACHINE

Address Box 44-728 care Paper Trade Journal. TF

WANTED — DISCARDED PAPER MILL FELTS. HIGHEST PRICES paid for all kinds of discarded paper mill felts. LARGE or SMALL QUANTITIES accepted. Prices quoted immediately on receipt of samples. ADDRESS: GLASER AND YOFFE, INC., 80 NORTH MAIN ST., NATICK, MASS. TF

WANTED

WANTED—Any Item of Paper Tube and Paper Can Machinery, Slitters, Tube Winders, Cutters, etc. etc. We will buy such machinery in any condition. Theo. Adams, 111 W. Washington St., Chicago, 2, Ill. TF

WANTED—Tachascope or similar device for measuring length of moving felt. Must have clutch. Address Box 45-90 care Paper Trade Journal. M-1

WANTED — Second-hand spiral tube-making machine suitable for toilet paper tubes, complete with automatic cutting-off device if available. Address Fort Howard Paper Company, Green Bay, Wis. M-8

WANTED—W & P Shredders, Evaporators, Generators and Boilers, Slitters, Cutters, Hydraulic Presses, Sheridan Presses, Dryers. Address Box 44-835 care Paper Trade Journal. tf

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PAPER TRADE JOURNAL

15 West 47th Street, New York, N. Y.

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The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Monsanto Chemical Co.
Norton Co.

ADHESIVES
Arabol Mfg. Co.
National Adhesives Division of National Starch Products, Inc.
Philadelphia Quartz Co.
Stein, Hall & Co., Inc.
United States Rubber Co.

AGITATORS
Appleton Machine Co.
Dilts Machine Works, Inc.
Deer Company
Downingtown Mfg. Co.
Improved Paper Machy. Corp.
E. D. Jones & Sons Co.
D. J. Murray Mfg. Co.
Montague Machine Co.
Moore & White Co.
Noble & Wood Machine Co.
H. K. Porter Company Inc.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

BAG MACHINES
Thomas W. Hall Co., Inc.
Pneevin Machine Co.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Weber, Herman G.

BARKERS AND CHIPPERS
Allis-Chalmers Mfg. Co.
Appleton Machine Co.
Carthage Machine Co.
D. J. Murray Mfg. Co.
Valley Iron Works Co.

BARS
Dilts Machine Works, Inc.
E. D. Jones & Sons Co.
The Moore & White Co.
Noble & Wood Machine Co.
Shartle Brothers Machine Co.
Simonds Worden White Co.
Valley Iron Works Co.

BEARINGS
Black-Clawson Company
Jones, E. D. & Sons Co.
The Manhattan Rubber Mfg. Co.
Montague Machine Works
Rollway Bearing Co.
Shartle Brothers Machine Co.
Shenango-Penn Mold Co.
SKF Industries Inc.
Timken Roller Bearing Co.
Valley Iron Works Co.
T. B. Wood's Sons Company

BEATERS & JORDANS
The Appleton Machine Co.
Black-Clawson Company
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Herman Mfg. Co.
E. D. Jones & Sons Co.
Noble & Wood Machine Co.
J. J. Ross Company
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works

BED PLATES
Bahr Brothers Mfg. Co.
Dilts Machine Works Inc.
Downingtown Mfg. Co.
Farrel-Birmingham Co., Inc.
E. D. Jones & Sons Co.
Noble & Wood Machine Co.
Shartle Brothers Machine Co.
Simonds Worden White Co.
Valley Iron Works Co.

BELTING
Allis-Chalmers Mfg. Co.
The Cincinnati Rubber Mfg. Co.
The Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.
J. E. Rhoads & Sons
United States Rubber Co.
T. B. Wood's Sons Company
Worthington Pump & Machinery Corp.

BLEACHING APPARATUS
Improved Paper Machy. Corp.
E. D. Jones & Sons Co.
Perkins & Sons, Inc., B. F.
Moore & White Co.
Niagara Alkali Co.
Noble & Wood Machine Co.
Pennsylvania Salt Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

BLOW PIPES & PITS
Montague Machine Co.
Moore & White Co.
Murray Mfg. Co., D. J.
Walworth Company
Valley Iron Works Co.

BOTTOMS
Harrington & King Perforating Co.
Kalamazoo Tank & Silo Co.

CALENDERS
Black-Clawson Company
Downingtown Mfg. Co.
Farrel-Birmingham Co., Inc.
Lobdell Car Wheel Co.
Moore & White Co.
Perkins & Son, Inc., B. F.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works
Waldron Corp., John

CASTINGS
Appleton Machine Co.
Black-Clawson Company
Dilts Machine Works
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Fort Pitt Steel Casting Co., Div. H. K. Porter Company, Inc.
The Frederick Iron & Steel Co.
Grinnel Company
Hamblet Machine Co.
E. D. Jones & Sons Co.
Lobdell Car Wheel Co.
Magnus Metal Corp.
Montague Machine Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Shenango-Penn Mold Co.
Smith & Winchester Mfg. Co.
Traylor Engineering & Mfg. Co.
Union Machine Company
Union Screen Plate Co.
Valley Iron Works Co.
Walworth Company

CENTRIFUGAL MACHINERY
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De Laval Steam Turbine Co.
Nichols Engrg. & Research Corp.
Ross J. O. Eng. Co.
Shartle Brothers Machine Co.

CHEMICALS
Aktivin Corporation
Amer. Cyanamid & Chem. Corp.
Ansul Chemical Co.
Calco Chemical Co.
Diamond Alkali o.
Dispersion Process Inc.
Dow Chemical Company
E. I. du Pont de Nemours & Co., Inc.
General Dyestuff Corp.
Geigy Co., Inc.
Gottesman & Co.
Hooker Electrochemical Company
The Mathieson Alkali Works, Inc.
Monsanto Chemical Company
The Neville Company
National Oil Products Co.
Naugatuck Chemical Div. of U. S. Rubber Co.
Niagara Alkali Company
Paper Makers Chemical Department, Hercules Powder Co.
Pennsylvania Salt Mfg. Co.
Pioneer Salt Company
Pittsburgh Plate Glass Co., Columbia Chemical Division
Solvay Sales Corp.
Stauffer Chemical Company
United States Rubber Co.
Witco Chemical Co.
Wyandotte Chemicals Corp.

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Oakite Products, Inc.
Paper Makers Chemical Department, Hercules Powder Co.
Magnus Chemical Co.
Nichols Engrg. & Research Corp.
Pennsylvania Salt Mfg. Co.
Philadelphia Quartz Co.
Pittsburgh Plate Glass Co., Columbia Chemical Division
Solvay Sales Corp.
Wyandotte Chemicals Corp.
J. B. Ford Division

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Hudson Sharp Machine Company
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Horton Manufacturing Co.
Rodney Hunt Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
Stearns Magnetic Mfg. Co.
Valley Iron Works Co.
T. B. Wood's Sons Company

COATING MACHINERY
Hudson Sharp Machine Company
Moore & White Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
Waldron Corporation, John
Weber, Herman G.

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Ingersoll-Rand Co.
Nash Engineering Co.
Worthington Pump & Machinery Corp.

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Frederic C. Clark
W. R. Cliffe
Ferguson, Hardy S.
Hardy, George F.
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The Kohler System Company
L. I. M. E.
Merritt-Chapman & Scott Corp.
Main, Inc., Chas. T.
J. E. Sirrine & Co.
Stone & Webster Engrg. Corp.

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Murray, D. J. Mfg. Co.
Ross Engineering Corp., J. O.

CORES
Elixman Paper Co.
Sonoco Products Co.
Rodney Hunt Machine Co.
Montague Machine Co.
Smith & Winchester Mfg. Co.
Walker-Goulard-Plehn Co.

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De Laval Steam Turbine Co.
Farrel-Birmingham Co., Inc.
The Frederick Iron & Steel
E. D. Jones & Sons Co.
Moore & White Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works
Waldron Corp., John
Westinghouse Electric Mfg. Co.
T. B. Wood's Sons Company

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Noble & Wood Mach. Co.
Perkins & Son, Inc., B. F.
The Smith & Winchester Mfg. Co.
Taylor Stiles & Co.

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Valley Iron Works Co.

DE-INKING
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H. K. Porter Company Inc.
Pusey & Jones Corp.

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Black-Clawson Company
Downingtown Mfg. Co.
Lobdell Co.
Montague Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

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Black-Clawson Company
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
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Rotogravure Engrg. Co.
The Sandy Hill Iron & Brass Works
Simonds Worden White Co.
Shartle Brothers
United States Rubber Co.
Westinghouse Electric & Manufacturing Company

DRIERS
Black-Clawson Company
Murray Mfg. Co., D. J.
J. J. Ross Company
Ross, J. O. Engineering Corp.
Rotogravure Engrg. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Traylor Engineering & Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

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Allis-Chalmers Mfg. Co.
Appleton Machine Co.
Bird Machine Co.
Black-Clawson Company
Davis, Frank H., Co.
De Laval Steam Turbine Co.
Dilts Machine Works
Downingtown Mfg. Co.
Farrel-Birmingham Co.
General Electric Company
Horton Manufacturing Co.
Rodney Hunt Machine Co.
Montague Machine Co.
Moore & White Co.
Murray, D. J. Mfg. Co.
Noble & Wood Machine Co.
Pusey & Jones Corp.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
T. B. Wood's Sons Co.
Valley Iron Works Co.
Westinghouse Electric & Manufacturing Company

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Appleton Machine Co.
Downingtown Mfg. Co.
E. D. Jones & Son Co.
Moore & White Co.
Noble & Wood Machine Co.
Norwood Engrg. Co.
D. J. Murray Mfg. Co.

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Ciba Company
E. I. du Pont de Nemours & Co.
Geigy Co., The
General Dyestuff Corp.
National Aniline Division, Allied Chemical & Dye Corp.
Paper Makers Chemical Department, Hercules Powder Co.
C. K. Williams & Co.
Witco Chemical Co.

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Goslin-Birmingham Mfg. Co., Inc.
Murray, D. J., Mfg. Co.
Traylor Engineering & Mfg. Co.

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B. F. Perkins & Son, Inc.
Ross Engineering Co., J. O.

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Merrick Scale Mfg. Co.
Leeds & Northrup
Traylor Engineering Co.
Wallace & Tiernan

FELTS
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Asten-Hill Mfg. Co.
Bloomfield Woolen Co.
Bulkley, Dunton Pulp Co. Inc.
Draper Bros. Corp.
Fitchburg Duck Mills
Huyck & Son, F. C.
Lockport Felt Co.
Mt. Vernon-Woodbury Mills, Inc.
Morey Paper Mill Supply Co.
Orr Felt & Blanket Co.
Shuler & Benninghofen
Waterbury Felt Co.
Woodward, Baldwin & Co.

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The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

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Amer. Cyanamid & Chem. Corp.
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W. H. Loomis Talc Corp.
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Vanderbilt Co., R. T.
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Moore & White Co.
J. O. Ross Engrg. Corp.
Worthington Pump & Mchy. Corp.
Witco Chemical Co.

FLOORING, GRATING & TREADS
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Klemp, W. F., Co.
Norton Co.
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Robinson, C. P.
United States Rubber Co.

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Noble & Wood Machine Co.
Oliver United Filters
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

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De Laval Steam Turbine Co.
Downingtown Mfg. Co.
Farrel-Birmingham Co.
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Moore & White Co.
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

GRINDERS
Covel-Hanchett Co.
Farrel-Birmingham Co.
Lobdell Car Wheel Co.
Montague Machine Co.
Samuel C. Rogers and Company
The Sandy Hill Iron & Brass Works

GRINDING WHEELS
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Simonds Worden White Co.
United States Rubber Co.

HEATING, VENTILATING AND AIR CONDITIONING
The Appleton Machine Co.
Armstrong Machine Works
E. D. Jones & Sons Co.
General Electric Co.
Grinnell Company
Leeds & Northrup
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
Ross Engineering Corp., J. O.
Shartle Brothers Machine Co.
Valley Iron Works Co.
Worthington Pump & Mchy Corp.

HOISTS
Appleton Machine Co.
Dilts Machine Works
Rodney Hunt Machine Co.
Ingersoll-Rand Co.
E. D. Jones & Sons Co.

HOSE (Air, Water, Suction, etc.)
The Cincinnati Rubber Mfg. Co.
The Manhattan Rubber Manufacturing Division of Raybestos-Manhattan Inc.
United States Rubber Co.

INSTRUMENTS, TESTING AND MEASURING
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M. P. Bowsher
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General Electric
W. & L. E. Gurley
Leeds & Northrup Company
National Technical Laboratories
B. F. Perkins & Son
Taylor Instrument Cos.
Wallace & Tiernan Co., Inc.
Westinghouse Electric & Manufacturing Company
Wilkens-Anderson Co.

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E. D. Jones & Sons Co.
Noble & Wood Machine Co.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

KNIVES
Black-Clawson Company
Dilts Machine Works, Inc.
Hamblet Machine Co.
E. D. Jones & Sons Co.
Simonds Worden White Co.
Valley Iron Works Co.

LABORATORY EQUIPMENT
Appleton Machine Co.
W. H. & L. D. Betz
Dilts Machine Works
E. D. Jones & Sons Co.
Leeds & Northrup Company
National Technical Laboratories
Noble & Wood Machine Co.
Taber Instrument Co.
Taylor Instrument Companies
Valley Iron Works Co.

LAY BOYS
Hamblet Machine Co.
Moore & White Co.
Shartle Brothers

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Gulf Refining Co.
Sinclair Refining Co.
Socony-Vacuum Oil Co., Inc.
Sun Oil Company
Tide Water Associated Oil Co.

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Montague Machine Co.
Lobdell Car Wheel Co.
Walker-Goulard-Plehn Co.

MIXERS
Youngstown Welding & Engrg. Co.

MOISTENING EQUIPMENT
The Spray Engineering Co.

MOTORS AND GENERATORS
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De Laval Steam Turbine Co.
General Electric Co.
Ingersoll-Rand Co.
Reliance Electric & Engrg. Co.
Westinghouse Electric & Manufacturing Company

PACKING BOXES
Johnson Corporation
Shartle Brothers Machine Co.

PACKING
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
United States Rubber Co.

PAPER MACHINES
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Moore & White Co.
Pusey & Jones
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester

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Montague Machine Co.
The Sandy Hill Iron & Brass Works
Valley Iron Works Co.

PAPER TUBE MACHINERY
Dietz Machine Works
Thomas W. Hall Co.
Hudson Sharp Machine Company
Langston Co., Samuel M.

PASTING MACHINES
Black-Clawson Company
Davis, Frank H., Co.
Murray, D. J., Mfg. Co.
Moore & White Co.
Potdevin Machine Co.
Shartle Brothers Machine Co.
Waldron Corp., John

PERFORATED METAL
Allis-Chalmers Mfg. Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.

PIPE
Black-Clawson Company
Crane Company
Grinnell Company
Shartle Brothers Machine Co.
Taylor Forge & Pipe Works
Walworth Company
Youngstown Welding & Engrg. Co.

PLATERS
The Norwood Engineering Company
Perkins & Son, Inc., B. F.

PLATES
Black-Clawson Company
Hendrick Mfg. Co.
Klemp, W. F., Co.
J. O. Ross Engrg. Corp.
Shartle Brothers Machine Co.
Timken Roller Bearing Co.

PLUGS
Black-Clawson Company
E. D. Jones & Sons Co.
The Noble & Wood Machine Co.
The Richardson Economy Plug Co.
Shartle Brothers Machine Co.

PRESSES
Black-Clawson Company
Farrel-Birmingham Co.
Dietz Machine Wks.
Thomas W. Hall Co.
Hudson-Sharp Machine Co.
Paper Converting Machine Co., Inc.
Potdevin Machine Co.
Rotogravure Engineering Co.
Shartle Brothers
Valley Iron Works Co.
Waldron Corp., John
Weber, Homer C.

PUG MILLS
Traylor Engineering & Mfg. Co.

PULPS
Andersen Co., J.
Bulkley, Dunton Pulp Co., Inc.
Gottesman & Co., Inc.
Perkins-Goodwin Co.
Price & Pierce, Ltd.
Pulp and Paper Trading Co.

PUMPS
Allis-Chalmers Mfg. Co.
Black-Clawson Company
Dorr Company
Downingtown Mfg. Co.
De Laval Steam Turbine Co.
Frederick Iron and Steel Co.
Ingersoll-Rand Co.
Johnson Corp.
Moore & White Co.
Nash Engineering Co.
Noble & Wood Machine Co.
Paper Converting Mch. Co.
Quimby Pump Co. Div. of H. K. Porter Company, Inc.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Warren Steam Pump Company
Worthington Pump & Machinery Corp.

RECOVERY SYSTEMS
Bulkley, Dunton Pulp Co., Inc.
Rodney Hunt Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Pusey & Jones
Ross Engineering Corp. J. O.
Valley Iron Works Co.

RECTANGULAR BINS
Traylor Engineering & Mfg. Co.

REELS
Black-Clawson Company
Downingtown Mfg. Co.
De Laval Steam Turbine Co.
Hudson Sharp Machine Company
The Kohler System Company
Montague Machine Co.
Moore & White Co.
Paper Converting Mch. Co.
Rodney Hunt Machine Co.
Rotogravure Engrg. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
The Smith & Winchester Mfg. Co.

REFINERS
Appleton Machine Co.
Behr Brothers Mfg. Co.
Bauer Brothers Co.
Dilts Machine Works
The Hermann Manufacturing Co.
E. D. Jones & Sons Co.
Murray, D. J. Mfg. Co.
Noble & Wood Machine Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Sprout, Waldron & Co.
Sutherland Refiner Corp.
Valley Iron Works

REGULATORS
Allis-Chalmers Mfg. Co.
Armstrong Machine Works
Bird Machine Company
The Brown Instrument Co.
The Foxboro Company
Jones, E. D., & Sons Co.
General Electric Co.
Johnson Corp.
Leeds & Northrup Company
National Technical Laboratories
Noble & Wood Machine Co.
Shartle Brothers
Taylor Instrument Companies
Wallace & Tiernan
Westinghouse Electric & Manufacturing Company

RESINS
American Cyanamid & Chemical Corp.
The Neville Company
The Resinous Products & Chemical Co.

ROLLS
Appleton Machine Co.
Black-Clawson Company
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Improved Paper Machy. Corp.
Lobdell Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Montague Machine Co.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
Perkins, B. F., & Sons Co.
Pusey & Jones Corp.
Roehlen Engraving Co.
J. J. Ross Company
Rodney Hunt Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Shenango-Penn Mold Co.
Sinclair Co.
Smith & Winchester Mfg. Co.
Stearns Magnetic Mfg. Co.
United States Rubber Co.
Valley Iron Works Co.
Waldron Corp., John

ROLL COVERS
The Cincinnati Rubber Mfg. Co.
Youngstown Welding & Engrg. Co.

ROLL STANDS
Cameron Machine Co.
Johnstone Eng. & Machine Co.
The Kohler System Company
Moore & White Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.

ROTARY KILNS
Traylor Engineering & Mfg. Co.

SATURATING MACHINES
Black-Clawson Company
Moore & White Co.
Noble & Wood Machine Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman C.

SCALES
Merrick Scale Mfg. Co.

SCREEN PLATES
Fitchburg Screen Plate Co.
Magnus Metal Corp.
Morey Paper Mill Supply Co.
Union Machine Co.
Union Screen Plate Co.

SCREENS
Allis-Chalmers Mfg. Co.
Appleton Wire Works
Appleton Machine Co.
Bird Machine Company
Carthage Machine Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Harrington & King Perforating Co.
Hendrick Manufacturing Co.
E. D. Jones & Sons Co.
Montague Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Traylor Engineering & Mfg. Co.
Valley Iron Works Co.

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Socony-Vacuum Co.
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Carthage Machine Co.
Dietz Machine Works
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Hudson Sharp Machine Company
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D. J. Murray Mfg. Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
J. J. Ross Company
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Simonds Worden White Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

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Stein, Hall & Co., Inc.

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Sickle Steam Specialties Co.

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The Stanley Works

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Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

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Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Westinghouse Electric & Manufacturing Company.

SULPHUR
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Stauffer Chemical Company
Texas Gulf Sulphur Co.
Witco Chemical Company

SULPHUR BURNERS
Valley Iron Works Co.

TALC
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W. H. Loomis Talc Corp.
International Talc Company

TANKS
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E. D. Jones & Sons Co.
Kalamazoo Tank & Silo Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
The Noble & Wood Machine Co.
H. K. Porter Company Inc.
Rodney Hunt

J. O. Ross Engrg. Corp.
Shartle Brothers Machine Co.
Traylor Engineering & Mfg. Co.
United States Rubber Co.
Waldron Corp., John
Youngstown Welding & Engrg. Co.

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Bird Machine Company
Bulkley, Dunton Pulp Co. Inc.
Carthage Machine Co.
Dilts Machine Works
Dorr Co.
Downingtown Mfg. Co.
Montague Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

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Witco Chemical Company

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Walworth Company

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Crane Co.
Grinnel Company
Johnson Corporation
Shartle Bros. Mch. Co.

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Rodney Hunt Machine Co.
Shartle Brothers
Valley Iron Works Co.

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De Laval Steam Turbine Co.
General Electric Company
Hunt, Rodney, Mach. Co.
Westinghouse Electric & Manufacturing Company
Worthington Pump & Machinery Corp.

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Gibbs-Brower Co.
Thomas W. Hall Co.
Noble & Wood Machine Co.
Rotogravure Engrg. Co.
J. J. Ross Company
Shartle Brothers Machine Co.

VALVES
Crane Company
Dilts Machine Works
The Foxboro Company
E. D. Jones & Sons Co.
Kennedy Valve Mfg. Co.
Magnus Metal Corp.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
William Powell Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Taylor Instrument Companies
Valley Iron Works Co.
Walworth Company

VATS & VAT PARTS
Union Machine Co.
Union Screen Plate Co.

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Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Rodney Hunt Machine Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.

WAXING MACHINERY
Black-Clawson Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G.

WELDING EQUIPMENT
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General Electric Company
Walworth Company
Westinghouse Electric & Manufacturing Company

WET MACHINES
Black-Clawson Co.
Carthage Machine Co.
Downingtown Mfg. Co.
Moore & White Co.
Montague Machine Co.
Noble & Wood Machine Co.
Pusey & Jones Corp.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

WINDERS AND REWINDERS
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Cameron Machine Co.
Dietz Machine Works
Downingtown Mfg. Co.
Thomas W. Hall Co.
Hudson-Sharp Mach. Co.
Langston Co., Samuel M.
Johnstone Eng. & Machine Co.
The Kohler System Company
Montague Machine Co.
Moore & White Co.
Paper Converting Mch. Co.
Potdevin Machine Co.
Pusey & Jones Corp.
Rotogravure Engrg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Smith & Winchester Mfg. Co.
Waldron Corp., John

WIRES
Appleton Wire Works
Black-Clawson Company
Bulkley, Dunton Pulp Co. Inc.
Cheney Bigelow Wire Works
Hayden Wire Works
International Wire Works
Lindsay Wire Weaving Co.
Shartle Brothers Machine Co.

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